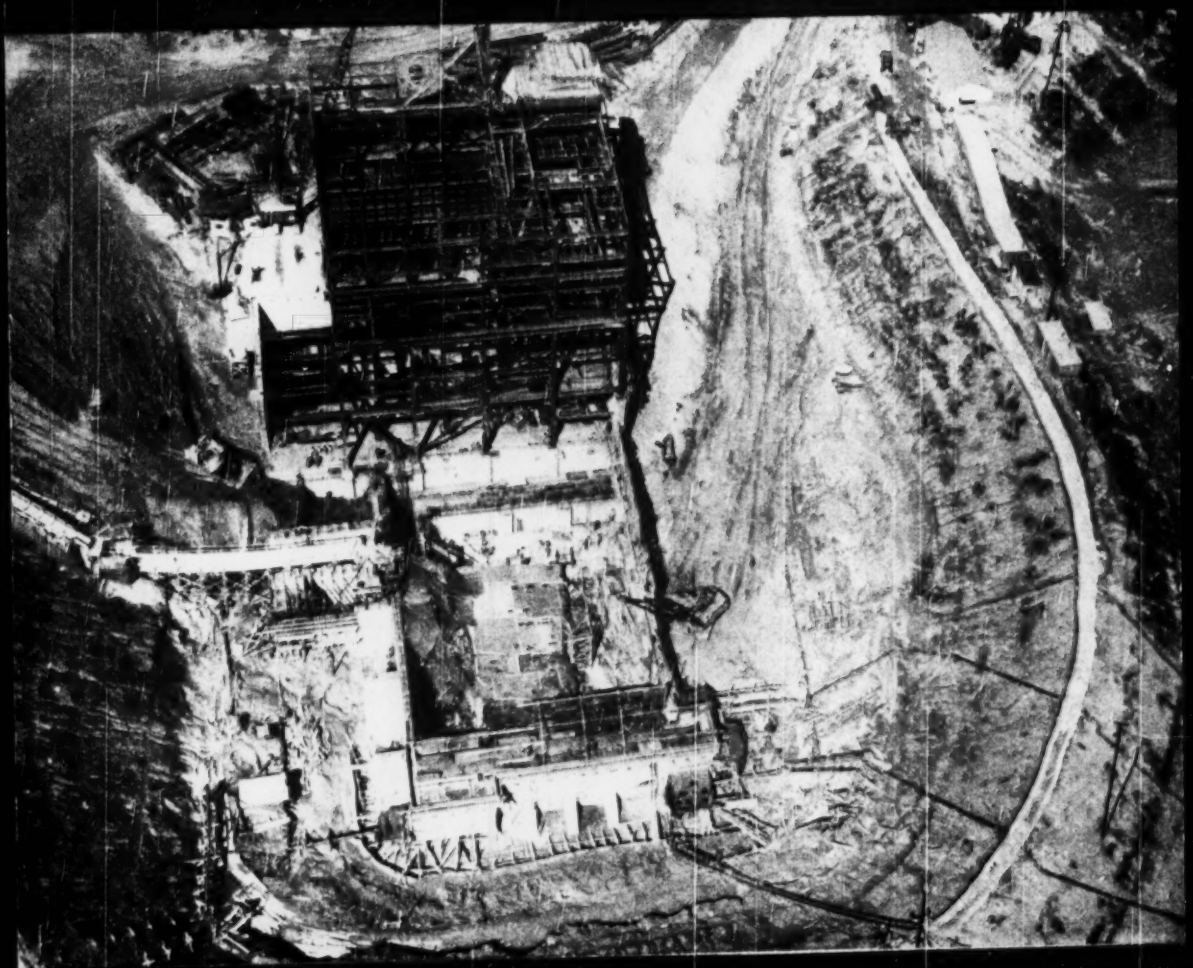
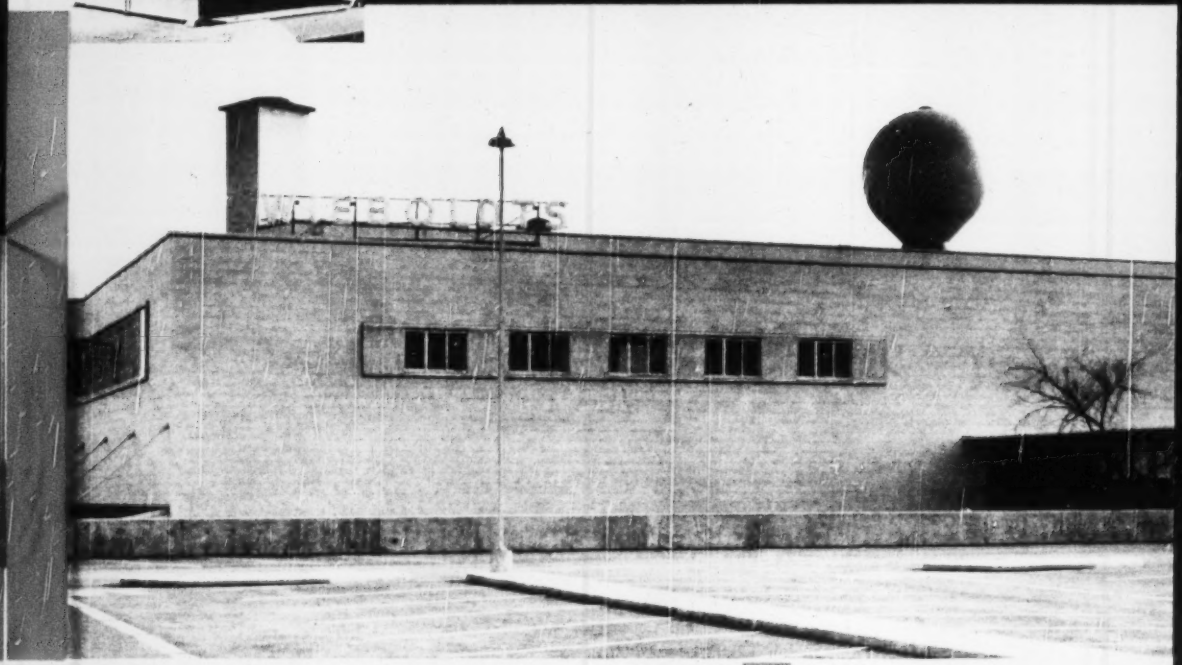
ENGINEERING NEWS-RECORD



A McGRAW-HILL PUBLICATION

Wieboldt's New Store has COMPLETE FIRE PROTECTION



WATERSPHERE Provides Gravity Pressure

The fire protection system in the new Evanston, Illinois branch of Wieboldt Stores, Incorporated, has *both* the features it needs—automatic sprinklers *and* a water reserve stored in a Horton tank.

Here's why its good, common sense to have a reserve like this. Water flows from the tank under fool-proof gravity pressure the *instant* a sprinkler head opens. The flames are extinguished before they can reduce your building to a shell of twisted girders framing a gutted interior.

Wieboldt's—one of the Chicago area's largest merchandising chains—values this complete protection so highly that they "wouldn't think of building a store without it . . ."

When you make plans for fire protection, be sure to include a gravity water supply for the sprinklers. Write our nearest office for a quotation stating tank capacity required, height to bottom, location, and type of insurance you carry.

The Wieboldt Watersphere provides gravity pressure by holding a reserve of water above the building it protects. Where ground space is available, Watersperes are usually erected as separate structures. Waterspheres are furnished in standard capacities from 25,000 to 150,000 gallons.

We also build ellipsoidal-bottom elevated tanks for industrial and commercial fire protection systems in standard capacities from 15,000 to 500,000 gallons. They are usually erected as part of a separate structure. Contact our nearest office for information about the type of tank you need.

CHICAGO BRIDGE & IRON COMPANY

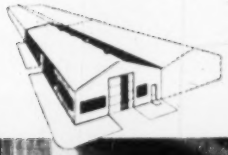
Atlanta, 3	2125 Healey Building	Detroit, 26	1506 Lafayette Building	Philadelphia, 3	1623—1700 Walnut Street Building
Birmingham, 1	1520 North 50th Street	Houston, 2	2109 National Standard Building	Salt Lake City, 4	512 West 17th South Street
Boston, 10	1012—201 Devonshire Street	Havana	402 Abreu Building	San Francisco, 11	1230—22 Battery St. Building
Chicago, 4	2101 McCormick Building	Los Angeles, 17	1511 General Petroleum Building	Seattle, 1	1312 Stuart Building
Cleveland, 15	2201 Guildhall Building	New York, 6	3311—165 Broadway Building	Tulsa, 3	1617 Hunt Building

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA. In Canada: HORTON STEEL WORKS, Limited, FORT ERIE, ONT.

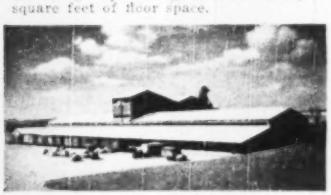
Need a new building?

Get exactly what you want—when you want it —at lowest possible cost!

with Standard Buildings by Luria



This Port of New York Authority marine cargo terminal building at Port Newark (interior shown above) consists of five 40-foot Luria units in multiple, each 460 feet long — providing a total of 92,000 square feet of floor space.



This large fertilizer plant shows how the specialized requirements of a specific industry can easily be met with simple adaptations of Luria Standard Buildings.

A large telephone company found that this Luria Standard Building, with masonry walls and corrugated steel roofing, met all their requirements for a low-cost service garage.

No matter how special your building requirements may be, chances are they're *standard* with Luria. For Luria Buildings have been designed to permit far greater *flexibility* than has ever before been available from a standard line. In fact, they can easily be adapted to practically *any type* of single-story structure.

This means that you can have all the cost-saving, time-saving *advantages* of standardization, without the usual limitations. Luria Buildings are already engineered for you — made from standard members, produced by cost-cutting, mass-production methods. There is no sacrifice of quality in any detail. Luria Buildings are rugged, permanent, heavy steel-frame structures designed to meet the most exacting building codes. Furthermore, they're *available now* — many sizes carried in stock, ready for prompt delivery to your building site.

For complete information, send in the coupon below.

Standard Buildings by LURIA

LURIA ENGINEERING CORPORATION
500 Fifth Ave., New York 18, N.Y., Dept. E 56

Gentlemen: Please send me a copy of your new catalog on Standard Buildings.

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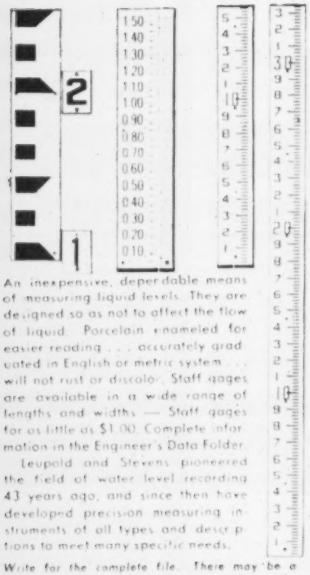
ENGINEER'S FILE ON HYDROGRAPHIC INSTRUMENTS

STEVENS
HYDROGRAPHIC INSTRUMENTS

A wide range of precision measuring instruments to record and indicate head, flow, and totalize flow; for waterworks, sewerage, irrigation and industrial uses. New, low cost methods of liquid level recording.

These methods and instruments for all liquid measuring problems are listed in a complete Engineer's Data folder for your convenience. This information folder is FREE and can be had by filling in the coupon below. The folder includes data on instruments to record fluctuations of liquids in oil production, stream gaging, deep wells, sewage, irrigation, etc., both accurately and economically.

STAFF GAGES



An inexpensive, dependable means of measuring liquid levels. They are designed so as not to affect the flow of liquid. Porcelain enameled for easier reading . . . accurately graduated in English or metric system . . . will not rust or discolor. Staff gages are available in a wide range of lengths and widths — Staff gages for as little as $1.00. Complete information in the Engineer's Data Folder.

Leupold and Stevens pioneered the field of water level recording 43 years ago, and since then have developed precision measuring instruments of all types and descriptions to meet many specific needs.

Write for the complete file. There may be a measuring device that exactly suits your specific requirements. Use the coupon below.

Please send me the Engineer's Data Folder with complete information on Hydrographic instruments.

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Address _____

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ENGINEERING NEWS-RECORD

Volume 144 MAY 4, 1950 No. 18

WALDO G. BOWMAN
Editor

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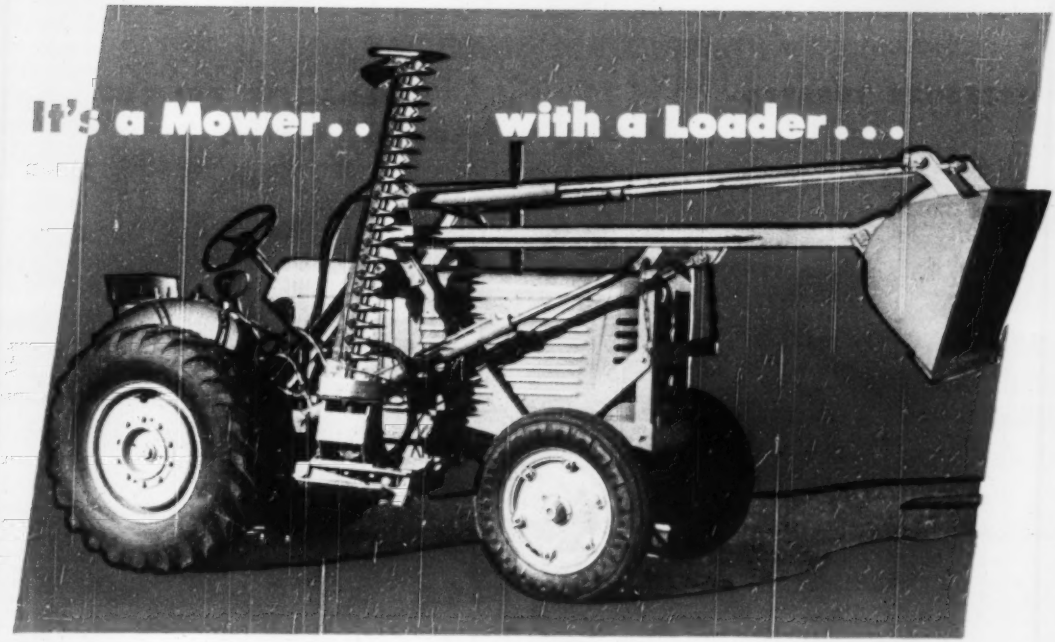

It's Your Cost-Cutting Combination!

Here's how to really step up the usefulness and profit-making ability of your Oliver Wheel Tractor-Loader. Simply add an Oliver Hydraulic Mower and you get a cost-cutting combination that will be busy virtually all year round. You can install the mower quickly and easily for those few days or weeks of work per mowing month . . . pull it off for the regular run of loading jobs. It's the ideal combination to cut your operating costs.

This powerful mower fits right into your tractor-loader. Cutter bar is driven by the hydraulic pump of the loader so no separate power units are required. Mower will cut anything from thick matted grass to moderate brush—in fact, almost anything that will pass between the knife guards. Hydraulic safety mechanism practically eliminates knife damage. Operator can cut right up to an obstruction . . . hydraulically raise the cutter bar to clear the obstruction . . . go right on mowing.

For all the facts on this cost-cutting combination that gives you year-round work with a tractor-loader-mower economically, see your Oliver Distributor or write us direct.

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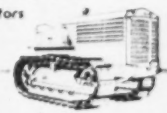
Industrial Division: 19300 Euclid Avenue, Cleveland 17, Ohio

A complete line of Industrial Wheel and Crawler Tractors



PRESSURE TREATED **AMCRECO** CREOSOTED PRODUCTS

PROTECT THE DANGER LINE!

TIMBERS • PILES • PLANKING

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BRIDGE TIES

Here's enduring protection at the ground line . . . where the greatest danger exists. Amcreco Creosoted Products, made from selected timber chosen to withstand heavy, severe driving, are pressure treated by the Lowry Process, refined and improved by Amcreco research, to assure maximum strength. For every job, Amcreco's advanced treating techniques assure longer service life and low maintenance. Take advantage of Amcreco's experience on your next job . . . our engineers will gladly work with you.

Pressure treated by the Lowry Process for strength that lasts!

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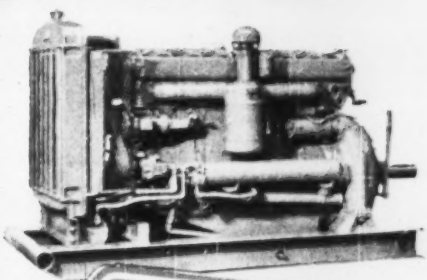
MURPHY DIESEL

blankets the nation

SALES . . PARTS . . SERVICE



MURPHY DIESEL DEALERS, strategically and conveniently located throughout the United States, are ready to assist you. Backing these dealers are direct factory sales engineers located in the field whose sole purpose it is to aid the dealers in serving you. This complete field organization is fully qualified to help analyze and handle your complete power requirements promptly and efficiently. This is another of the many good reasons for using Murphy Diesel power.

Further, Murphy Diesel simplicity of design and rugged, heavy duty construction means—

More Power — Greater Dependability
Greater Economy — Longer Life

Get acquainted with your Murphy Diesel Dealer, now, and let him show you how Murphy Diesels can deliver more horsepower for fewer dollars. If you do not know your dealer's name, we'll be happy to send it to you.

MURPHY DIESEL COMPANY
5311 W. Burnham St. Milwaukee 14, Wis.

MURPHY DIESEL

Heavy duty power
for all services

Murphy Diesel engines and power units are made in sizes from 90 to 220 H. P.; generator sets from 60 to 133 K. W.

PAY LOADS THAT PAY OFF

★ **New Mexico,** near Silver City. Two "Caterpillar" D8 Tractors push-and-pull-loading a "Caterpillar" No. 80 Scraper with 11½ yards of tough rock in a trifle over a minute—thanks to matched equipment and 130 horsepower. On 800-ft. one-way hauls the hauling team averaged 8 trips and 90 pay yards an hour. Total excavation 5.6 miles; 130,000 yards—about 60% rock. Two other "Caterpillar" Diesel Tractors, with Scraper and Bulldozers, were also used on this work.

QUICK, big, constant loads . . . they spell SPEED, VOLUME, PRODUCTION. And it's the tractor that plays the biggest part in the pay-off. You get the very tops in results when you sign up the *power, capacity,* and *dependability* that "Caterpillar" Diesel Tractors offer—the kind you see working on the state highway construction project pictured and described above.★

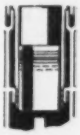
Says Contractor O. D. Cowart: "From my experience, 'Caterpillar' Diesel Tractors are unbeatable. Their ability to take punishment with a minimum of repairs makes them unquestionably the leader in the construction field."

That's putting it broadly. It's *sustained slugging power* that counts. Like the prize fighter who can stay on his feet round after round, it's the tractor which day after day can "take it and give it" that's the real profit-maker in the long run. "Caterpillar" Diesel Tractors are made of that kind of stuff. They're tough! They don't need "long counts" (down time). They're quick on the comeback . . . should a new part or fix-up be in order, there's an efficient and quick-acting dealer service standing by. "Caterpillar" leaves nothing undone toward building—and keeping—60-second minutes, 60-minute hours, 24-hour days of *fighting performance* into every unit that bears its name. *Ask your "Caterpillar" dealer for the proof—in mechanical evidence, in user experiences, in demonstrations.*

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

LOOK UNDER THE HIDE *for the qualities that pay off in tractor performance and long life . . . you'll find them in every "Caterpillar" detail. For example:*

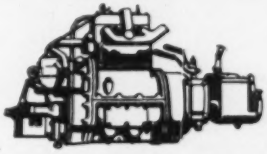
Hard Chrome-Faced Compression Rings are standard on all models of "Caterpillar" Diesel Tractor Engines —increasing life and performance at critical point of engine design.



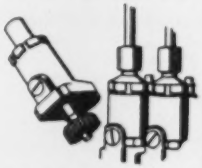
Alloy Iron Wet Type Cylinder Liners are "Hi-Electro" hardened — giving exceptionally long life. Wearing surface is chemically treated for proper break-in.

Solid Aluminum Alloy Connecting Rod and Main Bearings are exclusively "Caterpillar." Advantages: low rate of wear; fine heat-transfer characteristics; high corrosion resistance.

Air-Cooled "Lube" Oil. Air cooling lowers oil temperatures — reducing carbon, minimizing gum formations, and adding to the efficient serviceable life of working parts.

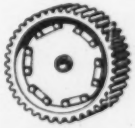


Independent Starting Engine of exclusive "Caterpillar" design gives safe-and-sure starts at all times, and allows the Diesel to build up full oil pressure before starting.

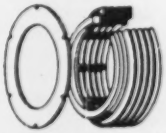


"Caterpillar"-Built Fuel Injection System is perfectly matched for "Cat" Engines. Pumps and valves require no adjustments, and are replaceable in the field—like spark plugs.

Tapered Splines—specially developed by "Caterpillar"—lock sprockets securely to shafts. So effective have they proved that the principle is similarly applied to other vital parts.

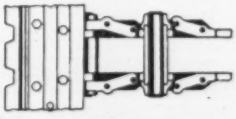


"Hi-Electro" Hardened Final Drive Gears. Teeth are three times harder after treatment and gear life is further boosted by the favorable compressive stress this process supplies.



Bellows Seals are self-aligning, self-adjusting and self-lubricating—keep oil in, dirt and water out without need for take-up adjustment or periodic attention.

Correct Track Alignment, both vertically and laterally, is assured with this rigid roller frame. Heavy diagonal brace and widely spaced bearings add life to tracks and rollers.

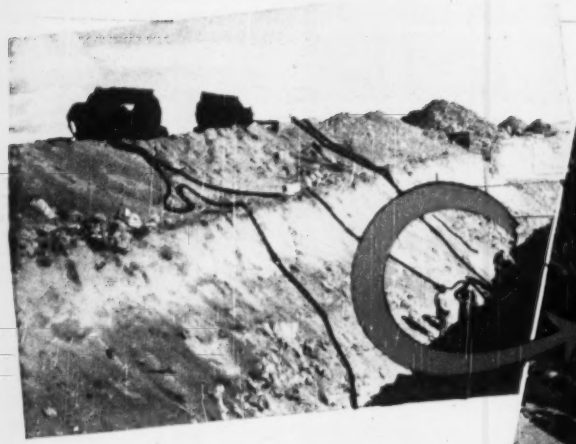


Counterbored Track Links — to provide a tighter, better sealed joint and greater bearing surface between bushings and track pins. Extra assurance of long life in abrasive soils!

Hour Meter to give user the facts on tractor performance and life. Hour meters have always been standard on "Cat" Engines because "Caterpillar" has nothing to hide.

CATERPILLAR

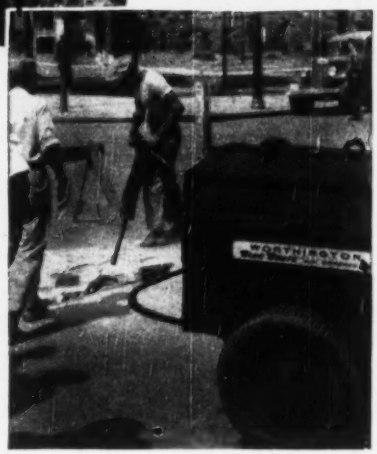
DIESEL ENGINES · TRACTORS · MOTOR GRADERS EARTHMOVING EQUIPMENT



REPORT FROM OREGON:
"SPLENDID PERFORMANCE"

Blue Brute team-mates — three of a battery of W.J-45 Rock Drills, powered by Portable Air Compressors — used by the Del R. Beebe Construction Co. of Eugene, Oregon, excavating for a big housing project's sewerage system. The Beebe Co. reports "splendid performance" in every detail of Blue Brute operation.

Oregon and Ohio Agree: BLUE BRUTE AIR TOOLS ARE TOP COST-CUTTERS!



REPORT FROM OHIO: *"VERY MUCH PLEASED"*

A Blue Brute construction team in Toledo, Ohio, removing street paving. Owner John V. Rush of Toledo says: "Our WB-85 Paving Breakers and 60 Portable Compressors make ideal combinations. In four months' continuous operation, removing and replacing 6" and 8" concrete base, *we have had absolutely no maintenance trouble on this equipment.* We are very much pleased with it."

Put Blue Brute teams to work for you — and count on big savings from then on! Starting with Blue Brute Portable Compressors — 60 to 900 — you've got the most dependable and economical air suppliers ever made — tireless, trouble-free performers, with the "easy breathing Feather"* Valves that get *all* the air out of every drop of fuel.

Then hook up their famous Blue Brute team mates — Hand-Held Rock Drills, Clay and Trench Diggers, Tampers, Sheeting Drivers, Wagon Drills — and you're making air go farther and do more than it ever did before. That's because these Worthington air tools not only hit harder and last longer — they have the lightness, compactness and *precision balance* that means easier handling — faster, smoother progress — hours and dollars saved on every job.

Learn how Blue Brute teamwork can save you time and money. See your nearby Blue Brute Distributor for more reasons why *there's more work in a Blue Brute*, or write us direct.

WORTHINGTON

WORTHINGTON PUMP AND MACHINERY CORPORATION
Construction Equipment Department, Harrison, New Jersey
Distributors in all principal cities

BUY BLUE BRUTES

*Reg. U.S. Pat. Off.

IF IT'S A CONSTRUCTION JOB, IT'S A BLUE BRUTE JOB

NEWS BRIEFS

Neat Budgeting—Georgia's Gov. Herman Talmadge wants to repeal state property taxes which bring in $6,700,000 and up highway spending $20,000,000. He wants a constitutional amendment which would allocate motor revenues to the highway department, reversing a 7-year-old state practice. The proposal, which will go to the legislature in January, would raise highway funds from today's $30,000,000 to $50,000,000 yearly.

Boston Buys Belgian—Some Boston builders discovered they can buy Belgian nails for $7.50 a keg. Domestic nails selling for $9, foreign nails are coming in by the boatload.

Any Color but Red—Ontario's highway department is considering coloring the salt it strews on highways each winter. That's so motorists will know the department's been on the job. "It's very discouraging," Deputy Minister J. D. Millar said, "after a hard night's work to receive compliments of unsalted highways. We are seriously considering coloring it green or something so that it will show up." The department used 50,000 tons last year.

Make 'em and Break 'em—Contractors on Georgia's Clark Hill Dam set a new concrete pouring record in February, proceeded to break it substantially in March, when they placed 95,000 cu yd on a three-shift, five-day basis.

New Roadbuilders—Gov. John W. Bonner, of Montana, has appointed Nels N. Bach, rancher, John R. Graham, businessman, and Harry Soderberg, mayor of Havre, to the state highway commission, replacing three members who resigned. (ENR April 27, p. 26).

Building for Trade—British Columbia has undertaken a two-year, $5,000,000 program of wharf construction and harbor improvement. About $3,000,000 is earmarked for new wharves and breakwaters at Vancouver Island and along the coast. There's $1,250,000 for a new jetty being built at the mouth of the Fraser River. The remainder is for Fraser River and Vancouver Harbor improvements.

Jobs for Juniors—U.S. Civil Service Commission will hold examinations soon for positions as engineering aide in the Reclamation Bureau's Region 6. Paying from $2,200 to $2,875, the jobs will be concerned with a compre-

(Continued on page 12)

Announcing THE New UNIT 614 ½ Yd.

a HEAVIER and BETTER machine ...at no increase in price!

Sturdy, box section side members . . . Cast steel hinges . . . Single, square structural steel dipper stick . . . Cast steel saddle block with adjustable and replaceable wear plates . . . Direct UNIT chain-crowd mechanism — eliminates cables, racks and pinions . . . Special equalizer insures even pull on both strands of the double crowd-chain.

Twin hook-rollers equalized and mounted on front and rear of rotating frame. Quickly adjusted by means of eccentric pin. 4 upper-load rollers and 4 hook rollers — all conical shaped and made of drop-forged steel.

The completely new UNIT 614 — ½ yard offers the same rugged construction usually found only in machines of greater capacity. Twenty-five years of engineering skill and craftsmanship have gone into the production of this model — an outstanding product resulting from specializing in sizes under one yard. Compare its construction features and design with any ½ yard machine in the market today. We are confident that your judgment will favor the UNIT 614.

Get the facts — Write today for literature.

UNIT CRANE & SHOVEL CORP.
6315 W. Burnham Street • Milwaukee 14, Wisconsin, U. S. A.

SHOVELS • DRAGLINES • CLAMSHELLS
CRANES • TRENCHOES • MAGNETS

ELLICOTT

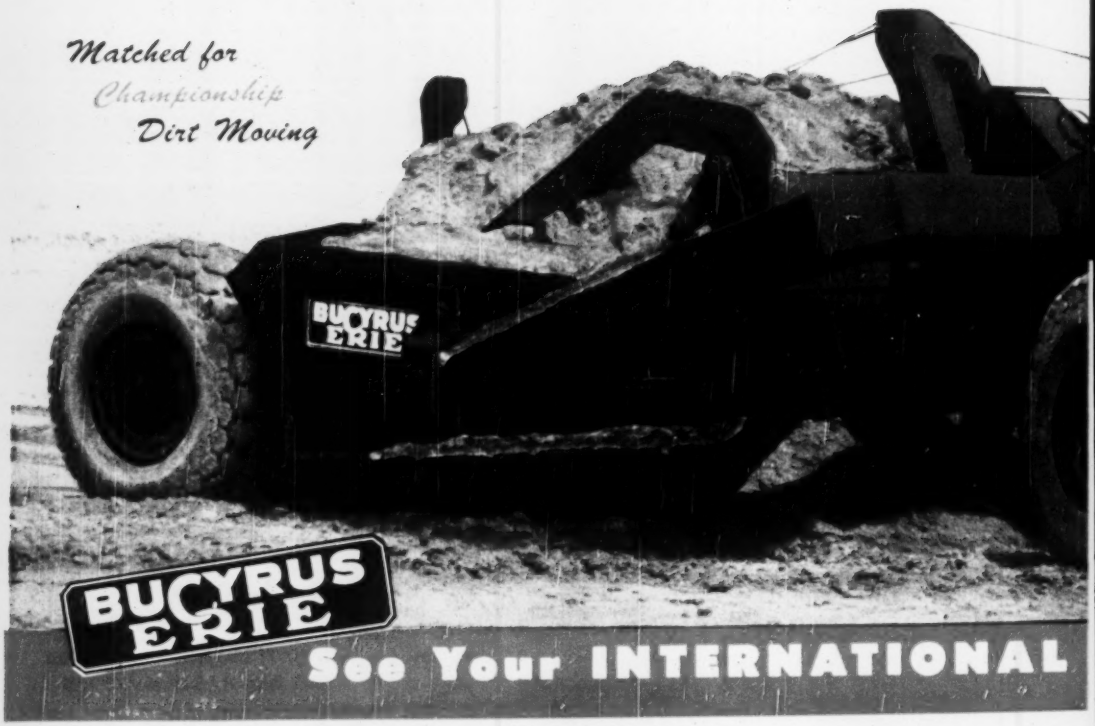
DREDGES ANY TYPE ANY SIZE ANY SERVICE

Only Ellicott offers: **65 years of experience** in dredge building; **a complete line** in all sizes; **undivided responsibility** — your dredge is designed, built and delivered under one contract.

Write for catalog: **ELLICOTT MACHINE CORPORATION**
1603 Bush St., Baltimore 30, Md.

Meet The 'BIG

Matched for Championship Dirt Moving



BUCYRUS ERIE

See Your INTERNATIONAL

RED' Team

Get acquainted with the combination that's matched for championship dirt moving: the "BIG RED" team — new International TD-24 tractor and Bucyrus-Erie B-type scraper. Owners are proving its superior performance on earthmoving jobs everywhere . . . are completely revising accepted time cycles for crawler tractor-scraper combinations.

Look over this team of matched equipment. See for yourself what the "BIG RED" team can do to cut your dirt costs. The tractor is the most powerful in the world; it is built by the largest company manufacturing crawler tractors. The scraper takes full advantage of tractor power, is built by the world's largest and oldest manufacturer of earthmoving equipment. This unequalled experience means sound design, money-making "BIG RED" performance!

1641SOC

BUCYRUS-ERIE COMPANY, South Milwaukee, Wis.

Industrial Tractor Distributor

ROGERS TRAILERS

ROGERS BROTHERS CORPORATION
135 Orchard St.
ALBION, PA.

EXPERIENCE *builds 'em* PERFORMANCE *sells 'em* — *Since 1915*

The successful movement of heavy, bulky machinery, such as these two moves made for the Hanna Coal Co., requires uncommon experience and the use of equipment basically engineered to handle these unusual operations.

At the right is shown a 55 cubic yard dipper (the largest in existance) which was moved from the Lukens Steel Co. of Coatesville, Penna., by A. Duie Pyle of that city, 300 miles to Adena, O., in five daylight periods.

The other exceptionally large dipper with "stick" was moved up and down grade, over macadam, gravel and dirt roads by Crane & Truck Service, Inc. of Pittsburgh, Penna., under the direction of J. C. Moran, Vice Pres. & Gen. Mgr. A Rogers D-80 D Trailer carried the dipper and a Rogers Pole Trailer supported the "stick". Being 152 feet long, it was necessary at times to remove fences and swing the pole trailer over into fields in making turns. A flat truck and Tournadozer controlled cables to balance the bucket on elevations.

Be guided by the judgment of experts. Investigate Rogers Trailers by all means.

Export Office: 50 Church St., New York 7, N. Y.
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HEAVY DUTY LOW BED TRAILERS IN VARIOUS TYPES AND SIZES FOR ALL PURPOSES

(Continued from page 9)

hensive plan for development of Missouri Basin water resources.

No Mud, Bud—Whoever builds a new bridge across the Patuxent River at Benedict, Md., had better go easy on stirring up mud. That part of the river is a fine oyster bed, and mud disturbs the oysters, not to mention watermen. At a conference between the state Roads Commission and the Fisheries Commission, it was agreed to dump dredged mud along the banks.

New York City, Please Copy—Tacoma, Wash., Municipal Water Division believes that one of its new wells is the biggest ever found in the Pacific Northwest. It's inside city limits and can produce almost 15,500,000 mgd.

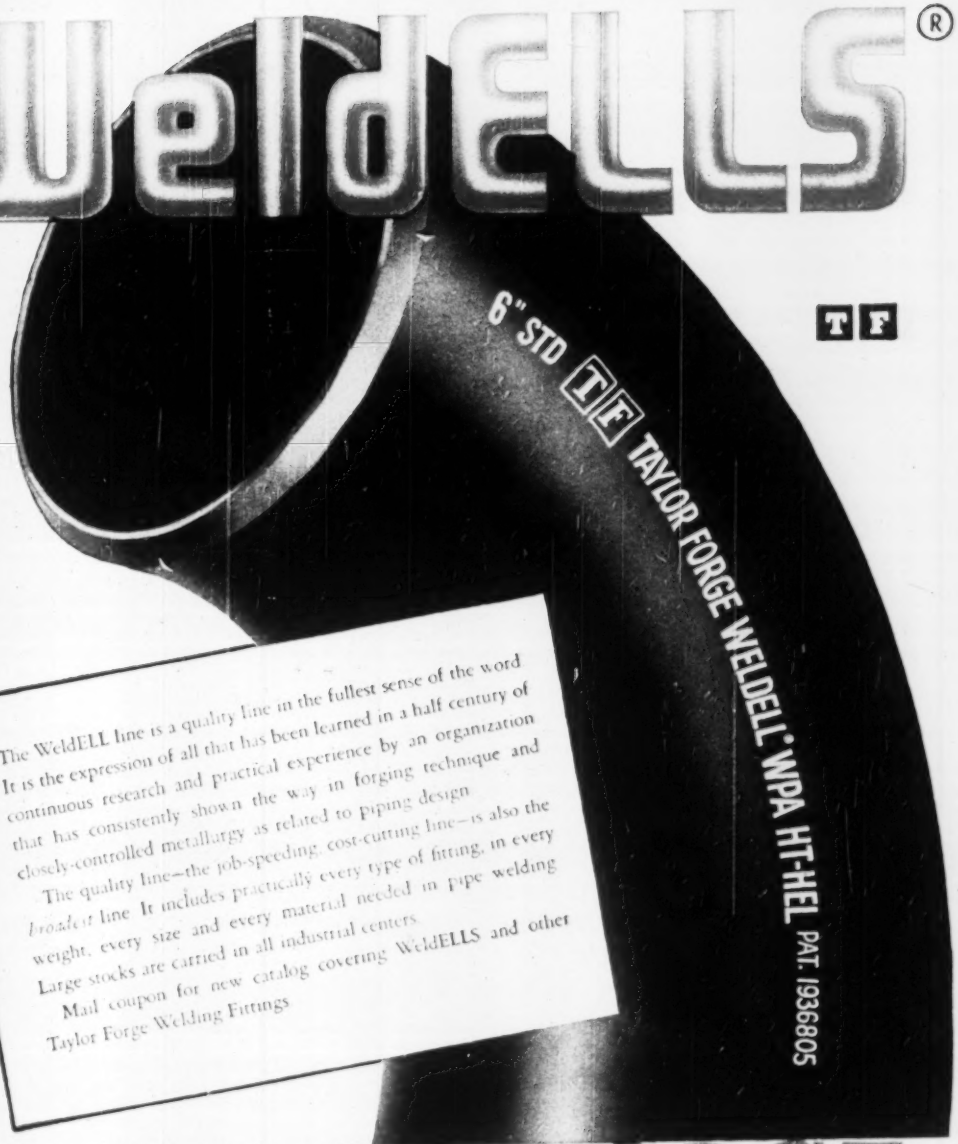
Toll Road's Legal—Colorado's Supreme Court has ruled that a proposed toll road between Denver and Boulder is legal, and that the state may, if necessary, contribute up to 50 percent of its cost. Work will start in July on the $5,000,000 highway if rights-of-way can be acquired. Howard, Needles, Tammen and Bergendoff will handle the engineering.

Construction Not "Interstate"—The Sixth U. S. Circuit Court says there was no interstate commerce involved in construction of the Kentucky Ordnance Works in 1942-45. It upheld a federal District Court which had ruled that the Rust Engineering Co. was not liable for $80,000 in back pay to 105 former employes who contended the money was due them for overtime under federal law.

THE COVER

Here's an aerial view of the Tanners Creek power plant of the Indiana Michigan Electric Co., on the Ohio River at Lawrenceburg, Ind. Started in September, 1948, it's to be operating next spring. Its cost with the first unit (150,000 kw net capability) will be about $18,000,000. As many as three units may be installed. The plant is one of two now under construction on the Ohio by subsidiaries of the American Gas & Electric Co. and contains one of six 150,000 kw turbogenerators being installed concurrently. AG&E does the engineering, design and construction supervision. George F. Hazelwood, Inc., of Cumberland, Md., has the heavy construction contract. The plant site is surrounded by a 40 ft dike. Foundations go down almost 40 ft. more. There's been a variation of almost 60 ft between minimum and maximum river stages at the site.

WeldELLS®



The WeldELL line is a quality line in the fullest sense of the word. It is the expression of all that has been learned in a half century of continuous research and practical experience by an organization that has consistently shown the way in forging technique and closely-controlled metallurgy as related to piping design.

The quality line—the job-speeding, cost-cutting line—is also the *broadest* line. It includes practically every type of fitting, in every weight, every size and every material needed in pipe welding. Large stocks are carried in all industrial centers.

Mail coupon for new catalog covering WeldELLS and other Taylor Forge Welding Fittings.

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Taylor Spiral Pipe is again promptly available in a broader range of sizes and thicknesses. Coupon brings pipe bulletin.

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☐ Please send new Catalog 484 covering welding fittings and forged steel flanges.
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Central Office Building, Board of Transportation of the City of New York, 370-380 Jay Street, Brooklyn, N. Y.
Contractor: Grove, Shepherd, Wilson & Kruge, Inc., New York City.
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Important savings . . . all along the line . . .
with LEHIGH EARLY STRENGTH CEMENT

Careful planning and the right material paid off in the erection of the Central Office Building for New York City's Board of Transportation.

To cut the extra costs of winter concrete construction, Grove, Shepherd, Wilson & Kruge stepped up their schedule for the floors with Lehigh Early Strength Cement . . . reduced the construction period by more than one half . . . *with these important savings:*

- 3 months of unproductive overhead
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On practically every type of construction you can save *all along the line* by the timely use of Lehigh Early Strength Cement.

Whatever your cement requirements, there are Lehigh Cements to fit them. Our Service Department will be glad to help you with any specific problem.

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C TOURNAPULLS average over 4,700 pay yards per day *on 650' haul*

Moss Construction Co. ordered additional Tournapull as result of experience on 160,000-yard airport job

Moss Construction Company of Paris, Illinois, brought in two C Tournapulls to handle 100% leveling job at Logan County Airport near Lincoln, Illinois. Project called for grading 160,000-yard airport site preparatory to paving. Cuts and fills were scattered over entire area . . . with one-way hauls ranging anywhere from 50 to 1000′ Because of the project's sprawling nature, no haul roads were established. Despite the scattered cuts and fills and lack of haul routes, the two "C's" chalked up the following production performance.

Moved ½ total yardage in first 17 days

Working in topsoil and clay on average 650′ one-way hauls, Moss Construction Company's production figures showed the two C Tournapulls moved 80,000 yards in the first 17 working days! That's an average of over 4,700 yards per 10-hour day. Even in wet going the "C's" delivered consistently. Checked by Mr. Moss after a heavy rainfall, the two C Tournapulls moved 1,450 pay yards of wet clay in just 3 hours . . . had the 6-week job 50% completed in the first 17 working days.

Drove 233 miles in 12 hours

When Moss Construction Company got this airport job, they drove the two rubber-tired "C's" over highways under their own power from Benton, Ill. Covered a distance of 233 miles in 12 hours. On basis of this typically outstanding all-around performance, Moss has ordered another C Tournapull. "Finest piece of dirtmoving equipment I ever used," is the way Contractor Moss put it.

You, too, will find these same Tournapull production advantages are available for your jobs — large or small. Let your LeTourneau Distributor *PROVE TO YOU* how you can get a NEW lowest-net-cost-per-yard on your earthmoving jobs. Let him show you the top profit possibilities available with high-speed, rubber-tired, electric-control Tournapulls and Tournadozers.

LETOURNEAU PEORIA, ILLINOIS — JOB-PROVED Over 6,000 Built and Shipped — **TOURNAPULLS**

MORE YARDS PER HOUR WITH RUBBER-TIRED POWER

Reduce operating costs for lower bids...

Low bids are mighty important as long as you retain enough profit. Many experienced contractors have found they can accomplish both by taking advantage of the savings made possible with Armco Corrugated Metal Structures.

Figured on an installed basis, Armco Structures save time, labor and money in many ways. They often weigh only one-tenth as much as more massive types, yet are amply strong for the purpose. This means low handling and hauling costs. Job costs go down because unskilled labor quickly makes the installation.

Standard Armco Pipe and PIPE-ARCH are supplied in any length that can be hauled or handled, while larger MULTI-PLATE Pipe, Arches or PIPE-ARCH are shipped knocked-down. No large and expensive equipment is needed for installation. A few men with a rope sling or an A-frame can handle the largest structure.

Assembly is made with simple band couplers, or by bolting prefabricated sections together. No hand excavation is required—no delay for formwork or curing and no backtracking to finish the job. Backfilling is done directly against the metal and traffic rolls immediately.

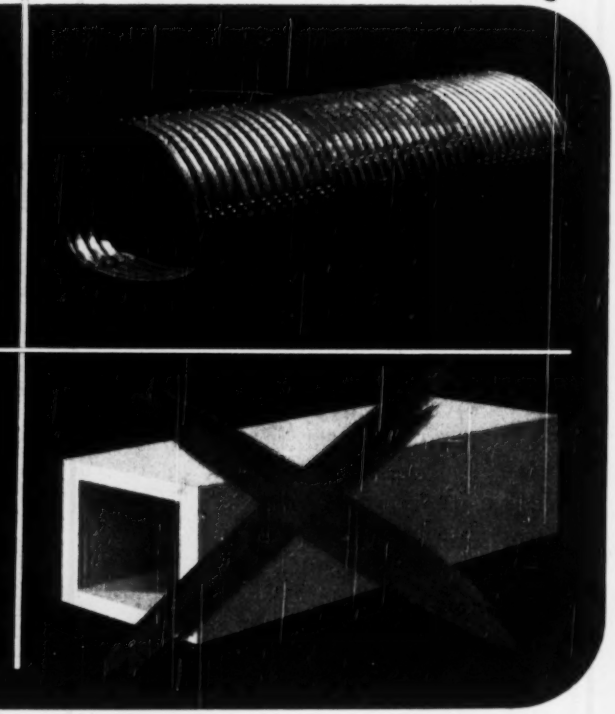
Bid low with good profit by figuring that next job with an Armco Corrugated Metal Structure. All are ideal for highway, railway, airport and municipal installations. Write for complete data. Armco Drainage & Metal Products, Inc., 3330 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation.

Export: The Armco International Corporation

ARMCO DRAINAGE STRUCTURES

Bids 26% lower

Experienced contractors figure the time, labor, and money-saving advantages of Armco Corrugated Metal Structures into their bids. On drainage work for a southern highway the winning contractor was able to bid 26% lower for Armco MULTI-PLATE PIPE-ARCH than competing bids for a monolithic box structure.



THE CONSTRUCTION WEEK

HOLD THAT CUT-OFF DATE!—Homebuilders are up in arms over intimations from the Veterans Administration that it may terminate combination FHA-VA mortgage loans before Dec. 31 (final cut-off date set by the 1950 Housing Act). The law gives VA Administrator Carl Gray power to end the combination loan arrangement before the cut-off date, if he chooses. Some builders say the combination loans are financing half of current home sales to ex-GI's.

RUSH THOSE MINIMUMS—Within 90 days (by June 19) VA must adopt minimum house construction standards similar to those of FHA. Up to now, housing standards could be enforced by VA only on request of the ex-GI home buyer. And in the same 90 days following the signing of the 1950 Housing Act, VA must set up its direct-lending program (financed with $150 million under the new law). The act says that ex-GI's must have exhausted all other means of financing home purchases—but then can get direct loans from Uncle Sam.

PREFAB FLOP—Reconstruction Finance Corp's recent flyer into the prefab housing business is now an officially admitted failure. Negotiations to sell Lustron Corp., after RFC foreclosed its $37,500,000 investment there (ENR Feb. 23, p 27) have fallen through, and now RFC is out to salvage what it can through sale of assets. Observers say that if RFC can salvage $10,000,000, the taxpayers will be lucky.

WAIT AND SEE—President Truman is waiting until Congress clears his 21 initial reorganization proposals (submitted in March) before he sends another set to the Hill. Six of the March proposals are under fire in Congress now, with one—to put the Comptroller of Currency directly under the Secretary of the Treasury—seen as a sure loser. White House advisers are still debating transfer of RFC to Commerce or Treasury, and of Army civil functions to Interior.

SEAWAY OFFENSIVE—Administration big guns let loose powerful salvos in favor of the St. Lawrence Seaway and power project, as the House Public Works Committee began hearings on HJ Res 271 (approval of a U. S.-Canada agreement). Commerce Secretary Sawyer led off with testimony on both the economic and defense aspects of the scheme. The latter was bolstered by a special report of the National Security Resources Board, which sees advantages in the proposed waterway. Secretary of State Acheson followed with a plea for the $800 million development as an aid to national defense. But Washingtonians think it will take more pressure than the administration can muster to force approval at this session of Congress.

BOOM GOES ON—Canada's current building boom will continue through 1950, if government experts are right. C. D. Howe, trade and commerce minister, told Parliament that on the basis of annual reviews of investment and building materials supplies, Canadian construction volume will reach $2.3 billion—an increase of 12 percent over 1949.

DIVIDING THE WATERS—At least one bar to authorization of more reclamation projects in the Canadian River Basin (Oklahoma, Texas, New Mexico) was cleared by Congressional action when Congress ok'd negotiation of a compact to apportion the Canadian's waters. Now the Senate Interior Committee is talking over a House-passed bill to authorize the first project, in the Texas panhandle.

SF SUBWAY?—San Francisco's Mayor Elmer Robinson will ask voters in November to approve a $50,000,000 bond issue as a starter on a $130,000,000 subway system for the city. Long discussed, first stage of the project would be a two-track line under Market Street from the Bay Bridge terminal, through a couple of tunnels to 19th Ave. and Lincoln Way. Later additions would take the line to the Presidio and other outlying areas.

EAST AND WEST MEET—IN SEATTLE—Two major water crossings, east and west from Seattle, across Lake Washington to the east and Puget Sound to the west, are under serious survey. The Washington Highway Department disclosed that a survey of March traffic on the floating bridge across Lake Washington was within 2,000 vehicles of its saturation point, even though an earlier survey had indicated that a second such bridge, or tunnel, would not be feasible until 1955 or 1960, when the first would be used to capacity. To the west, survey crews report "excellent progress" on a survey for the Washington Toll Bridge Authority of a proposal for a bridge or tubes to the Kitsap peninsula, across Puget Sound. The legislature will be asked for another $400,000 to complete the planning if the proposal still looks valid next year. Charles Andrew, chief consulting engineer for the authority, says there'll be a complete report ready for the legislature next January.

You Don't Need to Keep your Fingers Crossed with Chlorination by W & T

Keeping fingers crossed over the dependability of chlorinating equipment is something that engineers who demand W&T Chlorinators can forget. They know they can forego the time honored symbol of hope-with-uncertainty and go on to other problems without worry or risk. Here's how they figure it.

W&T has a complete line of chlorinators and accessories for handling from ounces to tons of chlorine per day.

W&T has over 35 years' experience in solving all types of chlorination problems.

W&T has extensive research and development facilities to take on and solve new problems.

W&T has a large, precision machine shop which understands, from long experience, the exacting nature of chlorinator manufacturing.

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Thus, the engineers who say "W&T Chlorinators" know they have experience, dependability and sound theory behind their decision.

You'll find your W&T Representative willing and helpful on *your* chlorination problems, too. Why not call on him for your next job—instead of crossing your fingers?

The W&T Residual Chlorine Recorder gives better chlorination control in old plants as well as new.

WALLACE & TIERNAN COMPANY, INC.

CHLORINE AND CHEMICAL CONTROL EQUIPMENT

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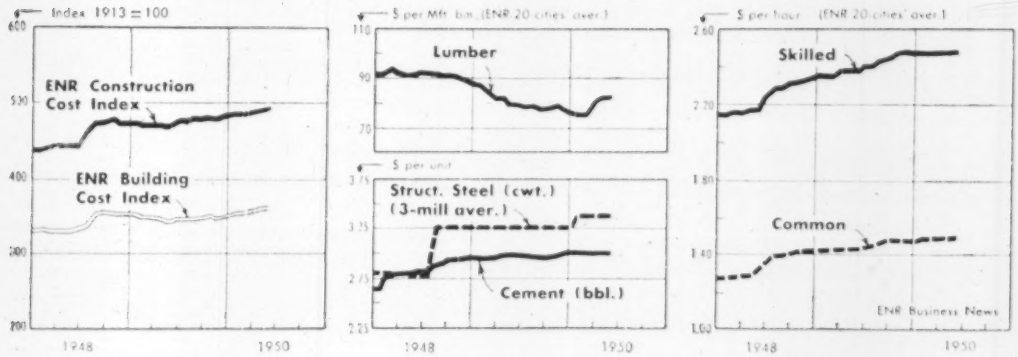
S-45

MAY CONSTRUCTION BUSINESS REPORT



ENR INDEXES (1913 = 100)	May '50	Apr. '50	% Change	May '49	% Change
Construction Cost	496.55	491.94	+0.9	472.10	+5.2
Building Cost	364.27	362.78	+0.4	348.92	+4.4
MATERIAL PRICES (20-cities' average)					
Cement, bulk, per bbl	2.961	2.961	0.0	2.996	−1.0
Structural Steel, (3-mill aver.), per cwt.	3.400	3.400	0.0	3.250	+4.6
Sand, per ton	1.968	1.973	−0.3	2.005	−1.8
Lumber, 2x4 Fir, per M ft. bm.	91.955	89.162	+3.1	86.320	+6.5
Lumber, 2x4 Pine, M ft. bm.	78.000	79.033	−1.3	74.080	+5.3
Common brick, per M	28.087	27.987	+0.4	27.769	+1.1
Ready-mixed concrete, per c. y.	10.267	10.313	−0.4	10.211	+0.5
Structural Clay Tile, 3x12x12 Per M	132.900	132.900	0.0	131.983	+0.7
WAGE RATES (20-cities' average)					
Common	1.511	1.493	+1.2	1.431	+5.6
Skilled (aver. 3 trades)	2.485	2.478	+0.3	2.384	+4.2
Bricklayers	2.756	2.739	+0.6	2.606	+5.8
Structural Ironworkers	2.450	2.447	+0.1	2.356	+4.0
Carpenters	2.249	2.247	+0.1	2.191	+2.6

	April			Four Months		
	1950	1949	% Change	1950	1949	% Change
CONTRACTS AWARDED (thous.)						
Total U. S. (ENR reported)	$885,044	$589,693	+50	$3,480,193	$2,462,132	+41
Private	549,861	274,023	+100	2,013,361	1,221,797	+65
Public	335,183	315,672	+6	1,466,832	1,240,335	+18
Federal	55,741	49,669	+12	170,908	362,658	+30
ENR Constr. Volume Index, '13 = 100	387	268	+44	363	262	+39
NEW CONSTRUCTION CAPITAL						
Total	299,653	390,480	−23	1,406,765	1,658,886	−15
State & Municipal Bond Sales	147,219	158,706	−7	811,579	814,899	−0.4
Corporate Security Sales	152,434	231,774	−34	595,186	844,387	−30
Federal (non-federal work)	.....	.....	.....	.....	.....	.....
Federal (federal work)	.....	.....	.....	.....	.....	.....

MATERIAL SHIPMENTS & LABOR SUPPLY	March (M) February (F) 1950	1949	% Change	Three Months Two Months 1950	1949	% Change
Cement, thous. bbls., Bur. of Mines	9,275 (F)	9,434 (F)	−2	19,368 (2)	17,890 (2)	+8
Fabr. Struc. Steel, thous. tons, AISC	153 (M)	178 (M)	−14	416 (3)	479 (3)	−14
Lumber, mil. ft. bm., NLMA	2,365 (F)	1,948 (F)	+21	5,498 (2)	4,133 (2)	+33
Lumber Prod., mil. ft. bm., NLMA	2,463 (F)	2,049 (F)	+20	4,850 (2)	4,281 (2)	+13
Contract Const. Employ., thous. BLS	1,903 (M)	1,947 (M)	−2	1,892 (3)	1,963 (3)	−3.6

Every Homelite Product Is Always Better

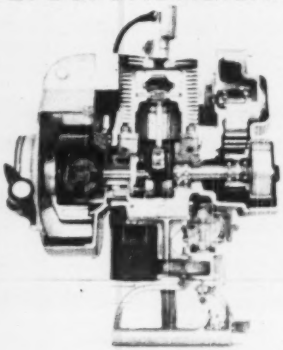
THREE WAYS

THE HOMELITE GASOLINE-ENGINE-DRIVEN ONE MAN CHAIN SAW

1. PERFORMANCE

Typical of all Homelite products, the Homelite Gasoline Engine Driven Chain Saw handles like a feather, yet cuts faster and with less trouble . . . whether it's felling, bucking, notching or undercutting . . . than any other saw its size.

2. DEPENDABILITY



Typical also of all Homelite products, the Homelite One Man Chain Saw is powerfully driven by the fine, proven Homelite four-cycle engine . . . a simple, foolproof engine that is the exclusive result of Homelite's experience in building close to 300,000 gasoline engine driven units.

3. SERVICE

In addition to all the low maintenance features of Homelite Chain Saws . . . the permanently sharp, chrome-plated chain, the foolproof automatic clutch, the freedom from gears and belts and the automatic lubrication . . . Homelite service shops the country over bring trained mechanics almost to your door, to keep your Homelite Chain Saw right up to Homelite nationally known performance standards.

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STICK TO THE RULE OF THREE

1. Performance
2. Dependability
3. Service . . . and you'll always stick to a Homelite

Wanted: Better Flat-Slab Formulas

FLAT-SLAB reinforced concrete floors without drop panels and without capitals on the columns are probably the easiest type of floor to construct. For light loads and within a large range of column spacings, they are probably also the most economical—if building code provisions are not unduly restrictive.

Flat-slab design is based on empirical formulas specified by building codes. These formulas are necessary because theoretical analysis is inadequate due to the impossibility of accounting for plastic flow, deflection and catenary effects.

Formulas for bending moments and shears have had some experimental verification. They apparently give reasonable—though possibly inaccurate—results. For example, analysis of a flat-slab floor by six different methods, including that given in the Washington, D. C. code (p 34), gave about the same answers.

In most codes, however, formulas are given for minimum depth of slab, minimum percentages of reinforcing steel and minimum punching shear that are illogical and generally unduly restrictive.

For example, in the apartment house floor described on p 34, the slab was made the same depth in each bay to facilitate construction. Hence, it was thicker in some areas than needed to meet minimum code requirements. Yet, because of the added depth, the code called for more steel—based on a percentage of cross-sectional area of the slab—than needed for moment, shear or minimum depth.

Further tests on flat slabs are evidently necessary to enable more satisfactory formulas to be developed. A good place to start might be a study of formulas for minimum depth, steel and punching shear.

Checkmate: Temporary or Permanent?

THE OHIO RIVER Valley Water Sanitation Compact—holding high promise of effective pollution abatement by grass-roots cooperation in the U. S. heartland—was born nearly two years ago. Since then its hard-driving commission and staff engineers have tackled their vastly complicated eleven-state problem. In the course of their efforts, they've built up a reputation for fairness, fact-finding and sensible step-by-step advancement. And cities as well as industries in the region are realizing it will be difficult to put off construction of treatment facilities much longer.

But now the very existence of the compact is threatened. The Supreme Court of West Virginia has declared that state's ratification of the compact unconstitutional. The 3-2 decision grew out of the state auditor's refusal to validate the West Virginia share of compact funds. Noteworthy are two points. The auditor authorized payment last year, the court's decision was based on the finding that the state legislature could not grant police powers in perpetuity to any state or interstate agency.

It's unfortunate that the court felt it must stand with the auditor on a legalism that may kill West Virginia's essential cooperation in this pioneering venture. The people of the state, through their representatives, agreed to participate jointly with neighboring states, and they stand to benefit greatly by cleaner waters.

With all respect for the court, it's also difficult to appreciate the basis for the decision. The compact specifically provides for interstate cooperation. It assigns to each state's commissioners the control of any policing action involving their state. This does not seem to be a delegation of police powers to an outside agency.

The sad part of the decision is the fact that Ohio and Pennsylvania participation is contingent upon that of West Virginia. If these key states are forced to withdraw, then it seems that the painfully erected compact must fall apart. This will leave a void into which the federal government—through its anti-pollution unit—will undoubtedly step—and promptly.

Fortunately, the West Virginia commissioners—backed up by legal experts of sister states—are not taking this setback lying down. They're preparing a request for a rehearing before the state court. If this fails, they plan to carry the case to the U. S. Supreme Court. The future of the ORVWSC is in delicate balance. And the people of the Ohio Valley can only hope that it will be permitted to continue its work at the state level with men in control who know the region's problems intimately.

Blasting and Public Relations

NEWSPAPER HEADLINES telling of people being injured and glass broken last week by blasting at the site of the United Nations headquarters in New York give special significance to the article on proper blasting practices for confined areas on p 36 of this issue. Not only does it tell the contractor how to select explosive loadings that won't damage buildings or injure people, but also places a valuable public relations tool in his hands. Armed with scientific data that prove he can do a safe blasting job, a contractor can go to property owners and give them a story that will tend to allay their fears of damage. This story also can forestall opportunistic lawsuits, and—if suits get to court—it will give the contractor a better defense.

Scientific selection of safe explosive loadings is in the interest of lower costs. Fewer adverse judgments will result in lower liability insurance rates for construction—a saving to be passed on to the owner.

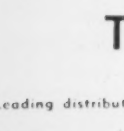
JAEGER invites 5-way comparison with any other pumps

1 - Actual priming speed
2 - Vacuum, capacity and pressure
3 - Gallons of water moved per gallon of fuel
4 - Self-cleaning ability
5 - Hours of service per dollar invested

1½" and 2" Aluminum Pumps: 5100 and 9000 gph. Replaceable liners, stainless steel shell fittings.

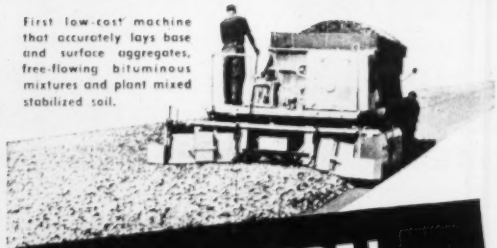
Heavy Duty 2", 3", and 4" Portables: Also lighter utility models.

Slow-Speed, Long-Life 6", 8", 10" Pumps —Full capacity at 1450 rpm instead of usual 1800, for all dewatering service.



2" to 8" Pressure Pumps for jetting and supply pumping at higher heads.

See your Jaeger distributor or send for complete Catalog P-10.

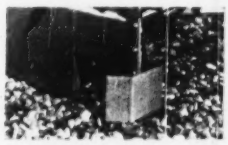


First low-cost machine that accurately lays base and surface aggregates, free-flowing bituminous mixtures and plant mixed stabilized soil.

IT'S HERE! Jaeger self-propelled aggregate spreader

Accurately Lays up to 10" Thickness, 8 to 12½ Ft. Widths: Four-wheel drive operates entirely on subgrade or compacted base—prevents displacement of newly laid material. Long straightedge runners carry screed independent of up-and-down machine motion, average out subgrade irregularities, positively maintain correct course thickness.

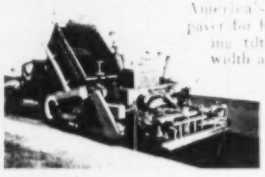
Quick Width Changes: 10' to 12½' by telescopic shaft, screed inserts. Block off for 8' to 10'.



Blends Perfect Joints Between Lanes with blender wings and side control gates. Saves hand work.

Tandem Spreaders Lay Full-Widths up to 25', Ready to Roll in One Operation: Two spreaders cost much less than one big bituminous paver, double your daily production of base, permit earlier application of top and keep your higher priced paver busy finishing top course—at tremendous savings to you. Send for Catalog SPS-9, giving complete details.

Jaeger Bituminous Paver "Teams" with Jaeger Spreader. America's most modern bituminous paver for high precision work—oscillating tiltable screeds, almost instant width adjustability to 12½', positive automatic leveling. Can pave flush to curb, gutter or previous lane. Combines all traction and heavy load to subgrade. Ask for Catalog BP-9.



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ENGINEERING NEWS-RECORD

MAY 4, 1950 VOL. 144 NO. 18

Water, soil and freeways top subjects at ASCE meet

Society holds spring meeting at Los Angeles—All but one technical division sponsors sessions at which 85 papers were presented—Much attention paid to water problems

Waldo G. Bowman
Editor, ENR

Colossal, a word not infrequently associated with events originating in California, may properly be applied to the spring meeting of the American Society of Civil Engineers at Los Angeles last week.

Beginning Wednesday morning (April 26), four to five technical sessions, sponsored by 12 of the society's 15 technical divisions, were usually under way simultaneously. Three days—and a half million words—later, a multitude of civil engineering facts had been placed on the record. A total of 1,580 registered for the convention, for which Ray E. Derby, sanitary engineer, Los Angeles Department of Water and Power, was general chairman. Robert R. Shoemaker, chief harbor engineer, Long Beach Harbor Department, is president of the Los Angeles Section of the society, which arranged the meeting.

Among the features of the technical sessions was an all-day symposium on the subsidence problem in the Los Angeles-Long Beach area, a series of papers on the construction of the "man-made rivers of the west," including both canals and the development of the Colorado and San Joaquin Rivers, and six papers on the conservative use of water emphasizing the need to use water more efficiently.

From the 85 papers presented, a long list of statements could profitably be quoted. These few are representative of the broadest applicability:

• **Tunnel repairs**—To permit economical repairs to leaky joint tunnels, adit plugs should be steel and equipped with access doors large enough to admit reasonably large equipment.—F. C. Steele, vice president, Pacific Gas & Electric Co.

• **Stresses from strain meters**—Results from seven years operation of nearly 1,500 Carlson elastic wire strain meters in Shasta Dam show that stresses have generally remained low and that the dam appears amply stable. Determining stress from measured strain is now a reliable procedure, and the results will influence analysis and design of large dams.—V. N. Raphael, U. S. Bureau of Reclamation.

• **Colorado River delta**—Reduced flow due to upstream diversions has resulted in the deterioration of meander channels in and building up of the Colorado River delta. This will eventuate in a serious flood threat to California's Imperial Valley and will make drainage of irrigated lands difficult. Proposed remedy is a flood control dam 100 miles above Yuma, and rectification of channels below Imperial Dam.—E. M. Lawson, American Commissioner, International Boundary Commission, El Paso, Texas.

• **High-cost freeways**—California freeways are costing from $2,000,000 to $5,000,000 per mile. The state has built or has underway over 600 miles of such roads and has "declared" an additional 850 miles for freeway construction in the future.—Charles H. Purcell, California Director of Public Works.

• **Records of structural settlement**—Engineers should insist on obtaining adequate soil data and continuous settlement or deflection records from the very start of construction of engineering structures. This information should candidly be made available to the profession, as has been done for the Los Angeles Pindentad Life Building, New Orleans Charity Hospital, the San Francisco Airport and a major oil refinery installation.—William W. Moore, Dames and Moore, consulting engineers, San Francisco.

• **Ion exchange water softening**—Polystyrene resinous exchangers have three advantageous characteristics. Their high capacity permits a smaller volumetric installation. They are not affected within a pH range of 1 to 14 and the chemical composition of the water does not tend to break down the exchanger. Operating efficiency is high.

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WRONG WAY—Boom of this crane bent backwards and crashed to the street in the Bronx, New York City, recently. With two other cranes, this one was lifting a 50-ton girder for an overpass on an expressway. The collapsing boom tore down several electric wires, from one of which three pedestrians suffered minor burns. (Wide World Photo)

ASCE votes to modernize constitution

Members of the American Society of Civil Engineers have voted, by 10,783 to 1,454, in favor of a revised and modernized constitution for the organization.

The results of the balloting were given to ASCE's Board of Direction at the start of its two-day session just prior to the society's spring meeting in Los Angeles last week.

The vote is significant on two counts. It is the largest total ever recorded by the society—44 percent of the membership having participated; the margin of approval of the constitutional change "over" to 1—was obtained in the face of considerable organized opposition to change from the old form.

The new constitution, more exactly described as an amendment to the existing constitution, was drafted over a period of several years by a special committee under chairmanship of Arthur W. Harrington, of Albany, N. Y. Its basic purpose is to remove inconsistencies in the old constitution and to make society operations more efficient. Immediate effect will be noticed principally with respect to meetings. These will be reduced from the current four per year to three, and the annual meeting will be held in October, instead of January as previously.

The board designated Houston and Louisville for the spring and summer meetings of 1951, and New Orleans and Denver for 1952.

The summer meeting this year will be held in Toronto, to be followed by a meeting in the fall at Chicago.

• **Other board actions**—The board took note of the society's responsibility to the national welfare by appropriating $6,000 to defray the expense of its members serving on the Engineers Joint Council's National Water Policy project. These committees are working to a July deadline to provide reports for the information of the President's Water Resources Policy Commission.

The board also received the report of the committee on cooperation between ASCE and the Associated General Contractors with particular approval. The report announced formation of a committee to undertake revision of the standard "construction contract, in view of changes in contract forms now under study in several government agencies. It also called attention to the current organization of toll authorities by the states for which no funds are supplied for engineering. This frequently results in calls for bids on the basis of sketchy plans or for contractors to supply the engineering. The board agreed with the committee that this was an unsound procedure that should be called to the attention of all state legislatures.

Water, soil, roads top ASCE subjects

(Continued from page 23)

These conclusions were reached after work at the world's largest softening plant where both polystyrene resins and synthetic silico-zeolites are used. W. W. Aultman, Metropolitan Water District of Southern California.

• **Water reclamation**—Reclaiming sewage for water supply use is feasible, but two basic concepts must be observed. First, it is a process separate and distinct from sewage treatment. Second, public acceptance of unrestricted reuse of sewage wholly depends on the inclusion, somewhere along the line, of a "natural" purification process—blending with lake or stream flow or with underground waters. A. M. Rawn, chief engineer, Los Angeles County Sanitation District.

"Natural" purification can be accomplished in Los Angeles County by using reclaimed water to recharge underground aquifers. This can be done by expanding existing flood control spreading basins since the underground gravels can receive huge quantities of water. H. E. Hasen, chief engineer, Los Angeles County Flood Control District.

• **Coordinating survey work**—Federal and state agencies making control surveys for various purposes should prosecute their work to provide closer spacing of permanent state plane coordinate stations. This can be done in addition to the primary purpose of the survey at very little additional cost as compared to the intrinsic savings to users of the state systems. C. L. Axsom, Los Angeles County Surveyor.

On one 31.5-mile section of the Hollywood Freeway, the 53 structures will cost $7,000,000, or 37 percent of the total. Such a high relative cost for structures places a great responsibility on bridge engineers to cut costs. Even a one percent reduction is substantial. Watch details to reduce labor costs. Beyond working stresses to reduce material costs. L. C. Hollister, bridge engineer, California.

• **Earthquake resistance**—Because modern architecture, with its all-glass walls, has cost code some of the structural elements formerly used to resist horizontal forces, floors and walls must be designed as load-carrying diaphragms. Walls can also be used when available. Utilizing such diaphragms is cheaper than attempting to make the frame sufficiently resistive. From tests and experience, California engineers are developing sound methods of design, analysis and construction for diaphragms of concrete, steel and timber. John G. Cast, consulting engineer, Los Angeles.

• **Beach protection**—Erosion of beaches is sometimes aided by man-made construction. The Santa Barbara breakwater, the Port Hueneme jetties, the Santa Monica breakwater and the Mission Bay jetties at San Diego serve navigation well, but have serious effects as regards the beaches. Edwin C. Kelton, engineer, California Division of Beaches and Parks.

• **Airports**—Most airports are land-starved. Only one U. S. airport has as much as 20 percent "extra" land, i.e., dimensions longer than runways. Most have one percent, or less. There is need for extra land, for safe operation and for the use of revenue-producing facilities. All airports should have "buffer" areas between them and built-up areas. On Class V airports, for example, title should be acquired for 2,000 ft beyond each end of the 5,000-ft runway and air rights should be acquired for 15,000 ft beyond these points to avoid payment of damages. William J. Fox, director, Department of Aviation, Los Angeles County.

• **Diatomaceous earth filters**—Compared with conventional rapid sand filters, diatomaceous earth filters will require only the space, have 2/3 the head loss, and cost 1/4 as much. These data result from a four-year investigative program that may well lead to a major installation to treat much of the Los Angeles municipal water supply. Further study is needed to lengthen filter runs and to improve filter-aid reclamation. This could reduce operating costs and help remove tastes and odors. Joseph M. Sanchis, sanitary engineer, Los Angeles Department of Water and Power.

• **Construction costs**—Barring a war or other catastrophe, construction costs should remain unchanged for the next year or two. Tending to increase costs are the "ratchets" that keeps wages from going down and the national policies of easy credit and deficit financing. These are balanced at present by improving methods and equipment, better use of workers, and improved design practices. However, there is a limit on the savings that can thus be made and, after a year or two, costs will probably start up again. George H. Atkinson, president, Guy F. Atkinson Co., general contractors, San Francisco.

Rise in federal share of road costs is opposed by highway user groups

Third Highway Transportation Congress favors retaining 50-50 sharing—Pros and cons of toll roads discussed

V. T. Boughton
Associate Editor, ENR

Active opposition to current legislation that would increase the federal share of highway construction costs was voiced at the Highway Transportation Congress at Washington last week. Toll financing of roads also was opposed in resolutions adopted at the closing session, as was the plan for letting states use future federal-aid funds to repay bonds issued as a means for speeding current road work. This plan had been included in bills now before Congress as a means for offsetting the current demand for more toll roads.

The Highway Transportation Congress was the third to be held under the auspices of the National Highway Users Conference as a means for helping the many local organizations in the conference shape their thinking on current highway issues. Representatives of those organizations in attendance at the meeting went on record as favoring giving priority to work on roads making up the Interstate Highway System, but did not favor increasing the federal share to 75% as is proposed by the American Association of State Highway Officials.

In thus opposing any increase, the meeting went contrary to the policy of one of the principal supporters of the Highway Users Conference, the American Automobile Association. The AAA would have the federal government pay two-thirds of the cost of construction works on the Interstate System.

• **Strong opposition**—Most outspoken in opposing any increase over the current 50-50 sharing of road costs was C. H. Buckins, assistant chief engineer of the Pennsylvania Highway Department, one of the four participants in a panel discussion of the federal role in highway development. Buckins said that it is time for the states to quit fooling their people by pretending that federal funds are obtained in some mysterious way and to begin to battle for sufficient funds at state levels. Buckins declared that by collecting over one billion dollars in excise taxes from the motorists of the nation in a year, and returning only $488 million to the states, the federal government is guilty of the greatest diversion of motor and gasoline taxes. "Withdrawal of the federal government from the field of gasoline taxation and motor excise taxes, with these funds accruing to the states, would do more to improve the highway situation than any possible increases in federal-aid appropriations or increases in the federal share for highway construction."

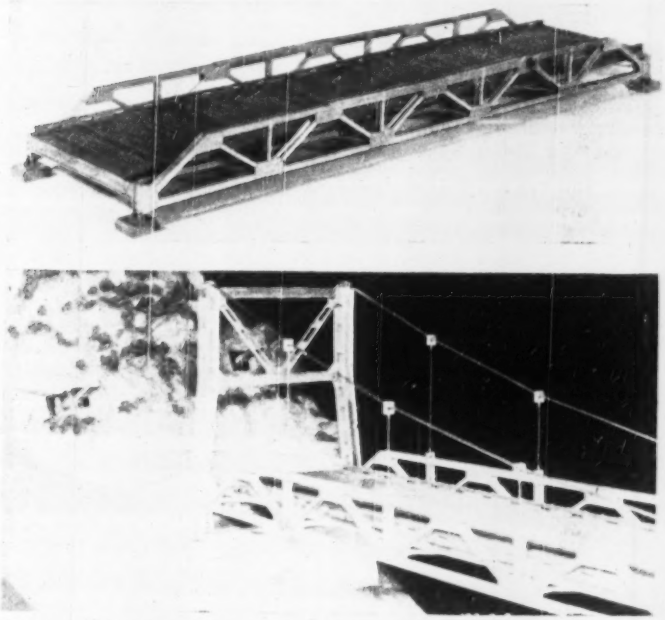
• **Program too ambitious**—Buckins criticized the standards for the Interstate System as being above what is actually needed for reasonably good highway service, citing conditions in his own state as an example. To meet the "minimum" standards set for that system, he said, would require expenditure of $926,879,000 on the 1,026 miles of the system in Pennsylvania. But to meet "practical and tolerable standards" would require that only $270 million be spent on 594 miles.

"In our opinion," he added, "the real answer to the problem is to concentrate more on salvaging, widening and resurfacing the presently improved roads, construction of the most important rural earth roads, improvement of bottlenecks in our large metropolitan areas, and continued reconstruction of the worst sections of our primary highways."

• **Local responsibility threatened**—A. J. Cronin, managing director of the Automobile Manufacturer's Association, said that any substantial increase in federal participation needs to be watched carefully if we are not to threaten state and local responsibility. Similar views were expressed by Russell E. Singer, executive vice president of the American Automobile Association. The only place where his association favors an increase is in the cost of bringing the Interstate System up to required standards in order to speed that work.

The association is strongly opposed to any federal participation in local road work, as proposed in the Chavez bill in the Senate—S 3424—and Singer urged all the organizations partici

(Continued on page 26)



QUICK BRIDGE—Search for a standardized bridge design primarily for military use that would make possible stocking of standard parts (ENR April 27, p. 25) has resulted in development of spans like the model shown here. At top is the pony truss span that can be assembled in lengths of 40 to 200 ft for use (below) in suspension bridges. Also developed are beam spans of 20 and 24 ft. Suspension bridges using the pony spans can be built in lengths up to 640 ft clear span. Both types, planned for a laminated wood flooring, can carry 50-ton combat tanks and comparatively heavy railway loadings.

(Continued from page 25)

pating in the Transportation Congress to oppose the Chavez bill actively. He said passage of the bill might well result in the collapse of the entire federal-aid program.

• **Defective management**—Charles L. Dearing, of the Brookings Institution, co-author of the book "National Transportation Policy," said that the present serious condition of the nation's highway system is due to defective management, to failure of concentrated efforts and funds on known needs and failure to protect the highway plant against encroachment and physical abuse. Consequently, he can see no justification for progressively larger federal appropriations unless the investment can be surrounded by appropriate safeguards.

• **Opposing views on toll roads**—Arguments for and against toll financing as a means for financing badly needed roads were laid before the Congress by a four-man panel.

R. E. Jorgensen, deputy highway commissioner of Connecticut, who led off in presenting arguments against toll roads, said that by a major objection to toll road financing, as generally applied, is that such a road is not financially feasible unless the alternate free road is functionally obsolete. "And here is one of the real stingers in this toll road development," he said. "Not only is the alternate free road obsolete, but it must remain obsolete in order that it may not compete with the toll road. Engineer's earning reports for toll road projects are based on such assumptions." Motorists, who have to use the old roads are doomed to use an obsolete road with no hope for relief," he added.

Jorgensen devoted most of his discussion to ways for obtaining needed facilities without resort to privately financed toll roads. He characterized as defeatist the arguments to the effect that there was no alternative in most cases. Ways can generally be found to get the needed money, he said, if there is a sincere public desire to do so.

The other speaker against the toll roads was E. Carroll Bean, of the Maine State Grange. He said that the Maine Turnpike "is rapidly going broke", that the income will not be sufficient to amortize its bonds.

• **Favorable aspects of toll roads**—Enoch R. Needles, consulting engineer, New York, whose firm did the engineering work for the Maine Turnpike, was the first speaker in favor of toll roads. He ignored the bridge and tunnels with toll levels stating that "a toll project always comes into being because of necessity. It is not formable on its other merits. [illegible]

The fact that does not appear debatable is the outstanding financial success of all our major highway toll crossings of the past 30 years."

Needles said that theorizing as to what is the best method for building badly needed highways has no practical value, that such roads will not be built unless there is public support for the proposed methods. He added that experience has shown that the public does not support the theoretically correct methods.

"Regardless of conflicting theories on taxation," Needles said, "practicality dictates that the best tax is the one which produces the most revenue with the least complaint and the toll on a highway bridge or tunnel fits that definition almost exactly. The toll is not paid except by the user, and at the service performed is not worth the toll charged, the traveller is at liberty to make other arrangements."

W. B. Getchell, Jr., executive director of the Maine Turnpike, also spoke in favor of toll roads. He noted that the highway problem of today is one of how to finance needed facilities and stated that the principle of assessing tolls has given us now the use of great facilities which otherwise might have taken years to obtain.

As to Bean's criticism of the financial set-up of the Maine Turnpike, Getchell said that income now exceeded the requirements for interest and operating costs and that when a sufficient reserve fund had been built up the excess will be used to amortize the bonds. If traffic grows according to predictions, he said, there will be no need for amortization of the bonds.

FHA to help cooperative housers

With low-interest loans to cooperatives by a government-backed corporation knocked out of the 1950 Housing Act by both the Senate and the House, the new law picks up the co-op aid enacted in 1949 and gives co-ops a small assist.

Few co-ops have come forward under last year's law. Only two or three have advanced to the stage of obtaining firm commitments from the Federal Housing Administration.

Something had to be done to encourage co-op ventures. With the signing of the 1950 Housing Act FHA Commissioner Franklin D. Richards announced that a new FHA division is being established to administer the cooperative housing program. Warren J. Lockwood has been appointed assistant commissioner in charge of this division, Richards said. Lockwood has served in important positions with FHA since its inception in 1934.

• **Insures non-profit housing**—As now amended, the housing law authorizes insurance of mortgages for nonprofit co-op housing corporations or trusts—with permanent occupancy limited to members—and for nonprofit corporations or trusts that build homes for individual ownership by members.

The insurable mortgage for a project ranges from 90 percent of estimated replacement cost up to 95 percent, depending upon the proportion of participating veterans of World War II. Mortgage amounts are limited to $8,100 per unit or $1,800 per room if the latter limitation is more desirable.

These limitations may be increased, depending upon the number of participating veterans, up to a maximum of $8,550 per unit or $1,900 per room. The interest rate is 4 percent, and the amortization period cannot exceed 40 years.

Hole through water shaft 3 weeks ahead of schedule

Construction crews holed through the 2,245-ft tunnel on the Grand Valley, Colo., reclamation project last week, three weeks ahead of schedule.

The tunnel is an emergency bypass necessitated by collapse, March 7, of a soft-ground section of a 36-year old tunnel, shutting off water supply for some 30,000 acres (ENR Mar. 30, p. 22, Apr. 20, p. 29).

Commissioner M. W. Straus addressed congratulatory letters to two construction firms, Rhoades-Shuster Construction Co., Inc., Los Angeles, and Grate-Callahan Construction Co., Dallas, for their successes in the race against the approaching irrigation season.

Completion date is May 28. "Now it looks as though even this deadline will be cut back as a result of the 'holing through' of the tunnel nearly three weeks in advance," Straus said. Awarded on a low bid of $609,800, the contract specified 72 days for completion.

Considerable work remains to be done, including an additional job of spraying on a coat of concrete to seal the tunnel against seeping of water into the slide area. New movement of an old slide caused the collapse of the old tunnel. This safeguard against any further slides, or danger to the railroad tracks at the foot of the slide area, will require an additional 10 days, but as the tube construction is proceeding, the work will still be completed within the stipulated time, Straus said.

Oregon highway damage hits new road funds

Highway engineer recommends quarter of new road budget be diverted to repair heavy traffic damage

Oregon's prewar highways have been damaged so severely by increased heavy traffic that State Highway Engineer R. H. Baldock has recommended that at least one-fourth of the $15,000,000 annual allotment for new highway construction be diverted for the next five years to repairing and strengthening existing highways.

Not built for the heavy traffic now using them, the state's roads are deteriorating rapidly, particularly during the past two years. This condition is blamed partly on the influx of new population and partly on persistent overloading.

• **Frequency big factor**—Baldock reported that today's frequency of heavy loads, even those under statutory weight limits, is a major cause of highway deterioration. As for disregard of weight regulations, he said, fines are insufficient to deter many operators.

"The damage to roads built for much lighter traffic than is now borne is so widespread throughout the state," Baldock said, "that unless immediate steps are taken, there is danger of a major portion of our entire highway system breaking up."

These damaged road conditions are prevalent more or less over the nation, but are particularly so in Oregon because of the heavy increase in population since 1940, which has resulted in material increase in traffic, particularly heavy motor truck traffic.

It will be necessary, in order to reduce annual maintenance costs as well as place our present highway system in shape to reconstruct our present pavements to withstand greater loads, and in building new roads, to make them stronger."

In Oregon highways are classified into two groups. On group 1 roads, trucks may operate with a maximum load of 72,000 lb. On group 2 roads, largely secondary and of lighter construction, the load-weight limit is 65,000 lb. The group 2 roads have suffered the greatest deterioration from use by trucks. In this group it has been necessary to spend large sums to repair truck damage to roads that would be adequate for lighter traffic, even though used by comparatively few trucks.

• **Asphaltic concrete used**—Plans for strengthening weakened highways call for laying about 4 in. of asphaltic concrete on top of existing roads. In this mixture of asphalt and aggregate, the asphalt acts as a binder. Cost of such reconstruction is estimated at about $24,000 per mi in cases where road widening is not required. This compares with new construction cost of from $32,000 to $58,000, depending on subgrade conditions.

Experience of Oregon highway engineers indicates that this reconstruction process brings results virtually the same as a new road, as the asphaltic concrete layer provides the same smooth surface as new construction, as well as eliminating the condition of fatigue in the road foundation.

As an example, Baldock cited the 12½ mi of Santiam highway between Albany and Lebanon, Ore. After 15 years of use, the annual surface maintenance cost of the original road had risen to $740 a mile. After being resurfaced in 1945, the present maintenance cost, after five years of use, is $110 a mile, only slightly above that of new construction.

Earth slide threatens half of Astoria's homes

A slope on which half the homes of Astoria, Ore., are located is in danger of slipping away in the near future, if preventive measures are not taken immediately.

That was the report given Gov. Douglas McKay by an Oregon Highway Department geologist who investigated an earth flow in which 25 homes were destroyed or damaged. House movers saved 15 more by prompt action.

The area immediately affected is 500 ft wide and 1,000 ft long, on a height overlooking the port and business area. A mile wide area immediately surrounding it is threatened. Geologist Lewis Scott reported to Governor McKay.

Excessive water, from rain and heavy, moist snow, soaked through 50 ft of ground to a bed of slick clay-like stone. Then the hillside began sliding down hill. The sliding began in January but did not assume serious proportions until early April. Then the earth began moving toward the Columbia River at about 5 to 10 ft daily. Eighteen homeowners had their houses moved. Three were demolished. A score more were damage more or less seriously.

After a week, the slide slowed to a rate of about eight ft in five days. Engineers said that the flow could be checked entirely only when a toe formed at the foot of the hill, halting further slides.

The highway department loaned a horizontal boring machine which was used to safeguard the surrounding area. Holes were bored into the foot of the hill and lined with tile. Immediately they produced drainage.

Economy takes beating in building fields

Civil works bill, veterans hospitals and local hospital construction get extra funds in Congress

The wheels of Congress ground more rapidly last week, and they ground exceeding coarse. Economy took a beating on three construction fronts.

In accord with heavy precedent, House conferees accepted almost without resistance additions made by the Senate to the flood control rivers and harbors authorization bill (ENR Apr. 20, p. 23). Practically no delegations were made in added authorizations. Such reductions as the House conferees held out for, apply almost exclusively to the allowances authorized in this bill for certain projects.

• **$1.5 billion more**—As reported by the conference to the two houses, the measure authorizes $1.3 billion for flood control and $200 million for rivers and harbors. The bill allows about $240 million for miscellaneous items, some $200 million of it to the Interior Department for continuing works in the Missouri River Basin under the Pick-Sloan plan adopted in the Flood Control Act of 1944.

On another front, the House, in unanimous rebuke to the economy plans of the President, restored to the Veterans Administration postwar hospital program. It added 16,000 beds cut out by Mr. Truman when he submitted his budget message in January, 1949. These involve an estimated $237 million.

Finally, the House rejected a recommendation of its own Appropriations Committee. That federal grants-in-aid for local hospital construction be held in fiscal 1951 to $75,000,000. The House voted $150 million a year in accordance with the original Hill-Burton Act of preceding years.

Adm. W. M. Angas retires

Rear Admiral William Mack Angas (CEC), Director of the Atlantic Division, Bureau of Yards and Docks, has retired after a 32-year Navy career. He has become chairman of the Civil Engineering department of Princeton University.

A graduate of M.I.T. in 1917, Admiral Angas is known to thousands of Seabees as the Officer in Charge, Third Naval Construction Forces, (CB's) who supervised the construction of many bases during the war, including the 7th Fleet Headquarters in Manila. He received the Legion of Merit for exceptionally meritorious service in that work.

1950 housing boom seen unaffected by lowering of FHA interest rate

Industry was off to record-breaking start before rate was lowered—No tightening of credit anticipated by ¼ percent drop

Lowering of the interest rate from 4½ to 4¼ percent for FHA insured mortgages on detached houses caused only mild surprise. The subject had been under intensive study for months, and rumors had been cropping up constantly that the rate was going to be reduced.

Purely by coincidence, the President signed the 1950 Housing Act (ENR Apr. 12, p. 27) on the same day that the forthcoming interest change was announced. The two events had no relation to each other. Decision to lower the interest ceiling had been made by the Federal Housing Administration without knowledge that Mr. Truman was going to sign the new housing law before leaving for his airtour of southern military installations.

Fundamental reason for the new FHA regulation was the conviction that 4¼ percent rate would be effective in supporting the 1950 housing market. The basic fact underlying this belief, as expressed by FHA Commissioner Franklin D. Richards, is the progressive easing of the mortgage money market during the last 15 months.

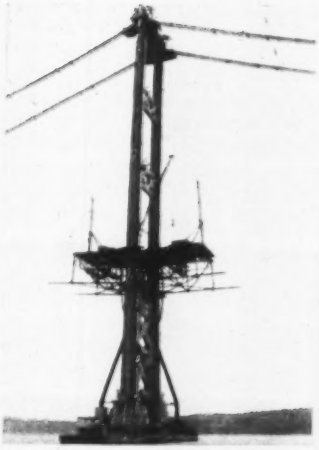
• **Credit not tightening.** There is no evidence, as he sees it, that the easy money market will tighten up soon. Continuous study of the mortgage market by the economists and statistics staff of FHA, plus the daily contact of Washington and zone officials with mortgage lenders led Richards and his advisers to conclude that the time was ripe for reduction of the maximum permissible rate for government insured paper.

No move of the kind would have been made if federal housing officials had thought it would slow down the pace of housing construction. With 1950 off to a history-making start of 285,000 new dwelling units put under construction in the first three months, Washington officials have no desire to spin the wheels.

Richards and his chief, Administrator Raymond M. Foley, of the Housing and Home Finance Agency, put out a joint statement that gives the essence of official thinking. "After months of thoroughly studying the mortgage money market, it was concluded that this lower rate would be effective in producing a high level of residential construction under the FHA program."

Two effects may be looked for as a result of the interest rate reduction. First, as Richards points out, would be a possible lowering of the premium on sale of FHA insured mortgages from one investor to another. Nationwide, this premium ranges today from 4 percent or less to perhaps 5 percent. The national average might be 1½ to 2 percent; Fannie Mae—RFC's mortgage purchasing subsidiary—collects 2 percent surcharge on its sales of FHA paper.

• **See lower premium.** With the reduction in interest rate, the premium probably will drop somewhat. Officials of RFC's Federal National Mortgage Association will not have to face the problem for some time. Fannie Mae's present holdings of $830 million in FHA 4¼ percent mortgages have acquired added attractiveness. It is unlikely that investors who previously had taken options to buy $150 million of these mortgages will let their options lapse.



TACOMA BRIDGE PROGRESS—Erection of the steel floor for the new Tacoma Narrows Bridge has begun from one of two towers. Work on 10 panels will proceed simultaneously from both 500-ft towers toward the middle of the main span. Bridge is to be opened this fall.

A second effect may be that more mortgages will hereafter be financed without FHA insurance. Investors may choose a higher interest rate in preference to an insured risk. This change would cause FHA no alarm if home financing did not suffer.

Even in these days of a so-called housing boom, a large part—probably at least half—of residential construction is financed without government insurance or guarantee. FHA is more than willing to see borrowers get their money from lenders on private deals, without government aid, so long as such home can be arranged. FHA's function, as federal officials see it, is to act as a stabilizer and stimulant of the home mortgage market. As part of that function, its regulation of interest rate "acceptible to FHA" is a potent market force.

Central Arizona Project rebuffed

Central Arizona Project's chances at this session have gone down for a time count. The House committee considering the Senate-passed bill to authorize the mammoth project voted to postpone any further action until June 15.

At that time the House group may revive the measure or may let it be to gather more dust. The blow came from Rep. Fred L. Crawford, Michigan Republican. On his motion, the committee voted to delay further discussion until the Budget Bureau supplied the answers to 20 questions Crawford propsed.

To give the members ample time to mull over the answers, the committee went along with the added proviso that the item could not be reported before the middle of June.

Prior to the postponement, the committee approved three amendments. One, by Crawford, eliminated the high-cost tunnel that hypothetically could some day be driven to deliver water from the proposed Bridge Canyon Reservoir to central Arizona farms, thus doing away with the pumping lift from Lake Havasu, behind Parker Dam, a couple of hundred miles downstream.

Both the other amendments were offered by Rep. John R. Murdock, Arizona Democrat and ardent supporter of the project. One of them stipulates that the repayment period shall not exceed 75 years. The other would limit the overall cost to $550 million, about 15 percent below the maximum proposed by the Senate. Murdock considered it in line with prospects for costs lower than had been indicated by estimates based on July 1947 prices.

MILLION-YARD YEAR—Construction crews got started early on the 1950 season at Hungry Horse Dam, on the Flathead River in western Montana. Operating on a 24-hour schedule, they hope to pour 1,000,000 cu yd of concrete this year, one-third of the dam's volume. (Reclamation Bureau Photo)

Air pollution conference at Washington this week

With $100 million a year being spent to reduce air pollution, the latest control equipment got a lot of attention at the first government-sponsored conference on the subject, held at Washington this week. Interior Secretary Oscar L. Chapman heads the inter-departmental committee sponsoring the conference.

To meet air pollution regulations, cities in New York state spent more than $2,000,000 modernizing plants during 1948, and at least $3,500,000 during 1949, according to estimates of that state's Health Department.

All types of equipment to control air pollution, including bag filters, scrubbers and some collectors, were discussed by a panel on equipment at the technical conference on air pollution. Authorities on air pollution from government, industry and educational and research institutions were invited.

Besides equipment, other panels discussed instrumentation, new developments in detecting, collecting and determining air contaminants, analytical methods and properties, the chemical analysis of air pollutants, health, including the effect of air pollution on cancer and acute infections, respiratory diseases, meteorology—the relationship of the weather to air pollution, legal problems in the control of air pollution, and agriculture—the effect of air pollution on crops and animals.

Industry, USPHS confer next week on industrial water pollution

Seek to organize a technical committee to supervise working groups investigating problem—Sparks major clean-up drive

Industry and government are getting ready to do something about industrial water pollution. Next week, industry representatives come to Washington to sit down with U. S. Public Health Service officials. The object: A working organization to cut down the pollution of the nation's streams by its industrial machines.

Major objective of the meeting is to set up a technical task committee of some 30 experts. They will supervise some 250 technicians who will form working committees to dig into the numerous problems of industrial pollution.

This meeting is expected to come up with "yardsticks" or basic formulas and terms upon which PHS and industry engineers can agree. The working committees are expected to submit information on such factors as permissible pollution for certain industrial wastes.

• **Information the problem.** One of the problems since establishment of the program has been industry's inability to get information on the water pollution control program and its effects. Industry has complained that no straightforward statement on industrial wastes has yet been issued by USPHS and that queries from industrial concerns often have gone unanswered.

Six months ago, Louis E. Warrick, chief of PHS Technical Service Branch, set out on a nation-wide tour to talk to industry and local authorities. During that time, he flew thousands of miles gathering reactions. He returned to Washington recently with an expression of willingness from industry to discuss the problems of stream pollution.

Although PHS has the major responsibility for administering the program, it is feeling its way and won't move without first getting reaction of industry's technical men. Anything that is done will be done with industry's cooperation. PHS realizes that the program can't be made to work unless industry is a willing participant in the campaign.

• **Federal aid available.** Under the Water Pollution Control Act of 1948, financial and technical aid is provided for states and municipalities tackling pollution. The act authorizes expenditures to the states not to exceed $27,000,000 a year for five years. Of this, $22,500,000 is to be loaned at low interest for the construction of public treatment works.

During the five-year period, $5,000,000 is authorized for grants to states for investigations and research on industrial wastes. Another $5,000,000 is for grants to municipalities for planning treatment works. There's a $4,000,000 authorization to build federal pollution research facilities in Cincinnati.

For use this fiscal year, Congress appropriated $2,450,000. No construction loan money was appropriated.

So far, PHS has set up a Division of Water Pollution Control in Washington and partitioned the country administratively into ten major river basins. Field headquarters were established recently in each area.

• **Changes proposed.** Several amendments to the Water Pollution Control Act have been proposed. One would increase the loan provisions from present comparatively small sum to $5,000,000 for individual projects. Another would reduce interest rates on these loans from 2 to 1 percent. A third would more than double annual appropriations for loan funds, from $22,500,000 to $50,000,000.

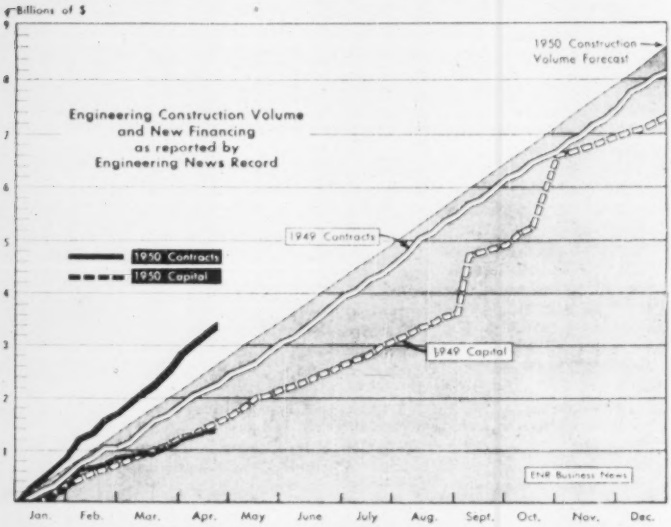
A separate bill by Representative Byrnes, of Wisconsin, would encourage the prevention of water pollution by allowing, as income tax deductions, amounts paid for industrial treatment work. The bill allows accelerated (five-year) depreciation, a device often used by government to promote private participation in activities government is pushing.

PHS spokesmen say they favor anything that will cut down pollution, but won't commit themselves on support of the Byrnes bill. This is a matter for the Internal Revenue people, they say.

The Byrnes bill would help most, middle-size firms which haven't the resources to build expensive treatment works. Most of larger firms have built their treatment plants.

But, while industry is making an effort to clean up, polluting substances are being poured in by municipalities at an even faster rate than they are being removed. Hundreds of cities continue to channel untreated sewage into rivers against orders of state health departments. A number of cities have appealed to the courts to put off construction of needed plants because of financial problems.

CONSTRUCTION BUSINESS



Housing boom sends April contract volume to record high for month

An all-time high in mass housing contracts sent April construction volume in April to a new record for the month, according to ENGINEERING NEWS-RECORD reports.

This is the fourth record month in a row. The April total of $885,044,000 represented an average of $213,761,000 a week. That is 7% higher than March, 45% above a year ago, and 19% above the previous record for April, set in 1942.

Both private and public construction topped March, 1950 and April, 1949.

• **Private awards a record**—Private contracts, paced by housing, set an all-time high. They averaged $137,465,000 a week, 10% above March—the previous record month for private construction.

Mass housing averaged $85,481,000 a week—30% above March and 20% higher than the record February average.

Commercial buildings also came close to a record. They were 22% above March and 137% higher than a year ago. Unclassified private construction was 70% above a year ago; but 23% under the average for March.

• **Roads lead public works**—Public works contracts in April averaged $85,796,000 a week—45% above March and 6% above a year ago.

Street and road contracts, averaging $26,277,000 a week—almost topped the all-time highs of July and August last year. They were 20% above March and 68% higher than a year ago.

Bridge construction gained 6% over March and was 38% above last year.

Only classifications showing declines both from a month ago and from April last year were sewerage and unclassified public works.

• **1950 going strong**—In the first four months of this year, every major type of private construction has held above last year. And most kinds of public works have, too—especially streets and roads, up 78%.

Only earthworks and waterways, bridges, and public housing contracts are below a year ago. And bridges are beginning to show a strong upturn.

Industrial building is now 4% above last year, compared with earlier forecasts of a 13-15% drop in 1950.

• **All areas up sharply**—The contract boom of 1950 stems from every region of the country. Increases over a year ago range from 23% in the Middle Atlantic States to 99% in New England.

ENGINEERING CONSTRUCTION CONTRACTS REPORTED TO ENGINEERING NEWS-RECORD — APRIL, 1950

ENGINEERING NEWS-RECORD reports for April, U. S. construction totaling $885,044,000. Reported awards average $213,761,000 a week in April, 7% above March, 45% above April, 1949. Private construction was $549,861,000; public work, $335,183,000. Four weeks in April, 1950; five weeks in March, 1950; four weeks in April, 1949. Dollar figures in thousands (000 omitted).

	April, 1950							U. S. Cumulative Four Months		% Change	Canada
	New England	Middle Atlantic	South	East Mid West	West of Mississippi	Far West	Total U. S.	1950	1949	49 '50	April, 1950
Public Works											
Waterworks	42	224	1,220	2,745	1,443	740	6,414	17,141	83,615	−61	807
Sewerage	468	941	2,000	1,830	2,022	2,308	9,569	16,438	74,519	−78	347
Bridges	174	1,807	1,291	1,233	1,222	2,162	7,889	28,969	103,345	−72	1,014
Earthwork and waterways	1,265	1,381	11,804	1,574	6,228	5,162	27,414	33,408	128,500	−74	1,992
Streets and roads	3,864	4,384	24,224	11,128	6,240	11,042	60,882	105,106	332,424	−68	4,434
Public buildings, residential	11,549	2,588	4,353	4,063	1,466		24,019	77,619	67,288	+15	2,429
Other public buildings	16,282	10,914	20,491	8,440	10,408	14,425	80,960	83,842	332,904	−75	4,351
Unclassified	1,780	2,904	2,200	1,270	6,180	6,143	20,477	22,880	118,588	−81	2,644
Total public	29,855	24,523	70,868	32,629	77,212	48,696	335,183	1,466,832	1,240,335	+18	16,385
Private											
Federal (general)											
Industrial buildings	2,000	19,631	14,568	8,103	23,748	11,603	55,741	479,908	362,858	+30	1,530
Residential											
Dwellings			780	238			1,018	2,483	1,975	+141	100
Industrial buildings	1,701	11,745	24,102	2,163	12,971	27,204	79,886	354,389	349,640	+ 1	19,942
Residential buildings	16,150	58,837	26,500	13,800	86,330	98,083	341,926	1,169,706	579,044	+102	9,865
Other commercial buildings	3,274	33,256	24,661	5,923	8,449	13,194	88,963	323,547	199,312	+ 62	2,709
Unclassified	25	625	13,078	521	20,382	5,006	41,827	163,036	105,717	+ 54	1,231
Total private	13,996	160,913	61,922	61,212	132,309	109,509	549,861	2,013,361	1,221,797	+ 65	37,818
Total Engineering Construction:											
April, 1950 — 4 weeks	43,851	232,436	138,790	93,841	209,521	158,205	885,044				54,203
March, 1950 — 5 weeks	52,587	274,288	175,622	134,118	236,358	144,248	965,431				24,304
April, 1949 — 4 weeks	29,370	189,855	107,855	43,147	77,858	80,000	528,085				104,800
Four Months — 1950	176,009	815,598	505,435	451,251	806,136	692,683		3,480,193			184,374
Four Months — 1949	88,700	588,436	329,604	172,198	441,801	500,454			2,402,192		187,780
% Change 49 to 50	+98	+39	+53	+162	+82	+38				+ 41	−1

BIDS AND BIDDERS

Major project news received after Construction Reports, page 78, went to press.

Lucky Peak Dam—Morrison-Knudsen Co., Boise, Idaho; J. A. Terteling & Sons, Boise; Macco Corp., Clearwater, Calif., and Puget Sound Bridge & Dredging Co., Seattle, Wash., were joint low bidders at $5,444,965 for constructing excavation, embankment, for diversion channel, cofferdams, main dam and spillway for Lucky Peak Dam on Boise River, Idaho. U. S. Engineers, whose estimated cost was $5,555,008, opened bids April 25 at Walla Walla, Wash.

Road and Bridge—New Jersey Turnpike Authority, Trenton, awarded contract for constructing section of turnpike in Salem and Gloucester Counties to S. J. Groves & Sons Co., Woodbridge, $5,095,733, and for bridges in Mercer and Middlesex Counties to P. T. Cox Construction Co., Inc., New York, N. Y., $1,565,168.

Housing—F. E. Construction Co., Bridgeport, Conn., has been awarded $3,794,440 contract for building housing for City of Bridgeport Housing Authority, Bridgeport, Conn.

Processing Plants—Tennessee Gas Transmission Co., Houston, Tex., plans processing plant to treat products removed from natural gasoline at Brandenburg, to cost about $2,000,000; and natural gasoline processing plant at Greensburg, Ky., estimated at $3,000,000.

College—Roman Catholic Archbishop of San Diego, Calif., received low bid from Fiepke Construction Co., San Diego, at $3,820,235 for buildings at San Diego College for Women.

Pipe Line—Anderson Brothers Corp., Houston, Tex., will construct eastern section of oil pipe line from Blanco to Satsuma and Baytown, Texas, at an estimated cost $7,450,000; western section has been awarded to Morrison Construction Co., Menard, Tex., at $6,785,000. The line is for the Humble Pipe Line Co., Houston.

Plant—Hinkin-Conkey Construction Co., Cleveland, has been awarded contract at about $3,000,000 by the Ford Motor Co., Dearborn, Mich., for excavation, substructure, and railroad tracks for plant at Cleveland. The entire plant will cost about $60,000,000.

Dwellings and Shopping Center—Miles Strickland, Houston, Tex., plans building dwellings and two shopping centers in Houston to cost about $6,400,000. Knostman & Webster, Houston, are architects.

Dam—Mexican Government, Mexico City, plans to build an irrigation dam and hydroelectric project at Tacotan, State of Jalisco, to cost in the vicinity of $3,400,000.

Reduction Plant—Harvey Machine Co., Inc., Aluminum & Brass Div., Los Angeles, Calif., plans aluminum reduction plant at Henderson, Nev. Cost will be about $5,000,000.

Gas Pipe Line—South Georgia Natural Gas Co., Atlanta, plans 144-mi natural gas line from Talbotton to Brooks County and 104 mi lateral lines to various communities in Georgia to deliver 40,000,000 cu ft per day. Estimated cost will be $6,600,000.

Catalytic Cracking Plant—Pan American Southern Corp., El Dorado, Ark., awarded contract to Foster Wheeler Corp., Houston, Tex., for second fluid catalytic cracking vapor and recovery unit at El Dorado. Cost will be about $2,700,000.

Shopping Center—MacDonald Products Co., San Francisco, Calif., plans constructing shopping center at Walnut Creek, Calif., to cost $3,000,000.

Hospital—St. Lukes Hospital, Milwaukee, Wis., will take bids June 1 for hospital at Milwaukee. Estimated cost is $2,522,000. G. J. DeGelleke, Milwaukee, is architect.

Housing—J. H. McGraw Construction Co., New York, N. Y., is low bidder at $3,020,000 for public housing project in Hartford, Conn., when City of Hartford Housing Authority opened bids April 25. Kane & Fairchild, Hartford, are architects.

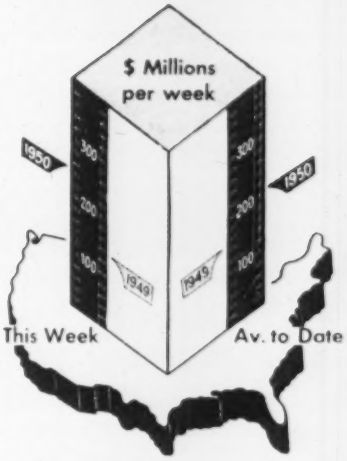
Veterans Hospitals—Veterans Administration, Washington, D. C., awarded contract for Chicago hospital to W. E. O'Neill Construction Co. and Kenney Construction Co., both Chicago, at $12,140,000. Schmidt, Garden & Erikson, Chicago, are architects. Contract for hospital at Cincinnati was awarded to John A. Johnson & Sons, Inc., Brooklyn, N. Y., at $7,278,983.

Steam Generating Station and Dam—Niagara Mohawk Power Co., New York, N. Y., plans to build steam electric station near Albany, $27,000,000 and dam on Sacandaga River near Stewart Bridge at $4,000,000. Stone & Webster, Inc., New York, N. Y., is engineer.

COSTS AND VOLUME

ENR INDEX NUMBERS

Index Base	100	1913	1926
Construction Cost	May 20	436.35	228.89
Building Cost	May 20	264.27	196.91
Volume	Apr. 20	587	170



Activity This Week

As reported to ENR (in millions of dollars)

Amount of contracts let

Week of	This Week	Cumulative 1950 (18 wks.)	Cumulative 1949 (18 wks.)	% chge
May 1				
1950				
Federal	$ 50.6	$ 661.5	$ 475.9	+39
State & Muni.	79.0	1,975.9	924.1	+114
Total Public	$129.6	$2,637.4	$1,400.1	+88
Total Private	148.9	2,543.3	1,222.9	+108
E. N. Total	$278.6	$5,180.8	$2,623.1	+98

Contracts by type of work

	This Week	Cumulative 1950 (18 wks.)	Cumulative 1949 (18 wks.)	% chge
Waterworks	$ 2.2	$ 47.4	$ 44.1	+8
Sewerage	6.1	85.2	71.6	+19
Bridges	6.1	117.9	112.0	+5
Highways	31.2	465.7	212.7	+119
Earthwork, Drainage, Dredging	4.1	124.1	72.9	+70
Buildings:				
Public	19.5	470.2	318.0	+48
Industrial	11.1	226.9	215.8	+5
Commercial	36.1	1,063.3	511.0	+108
Unclassified	30.0	215.6	104.1	+107

Note: Miscellaneous projects included are: Waterways and waterway protects; $25,000 other public works; $30,000 industrial buildings; $65,000 other building.

New capital for construction

	This Week	Cumulative 1950 (18 wks.)	Cumulative 1949 (18 wks.)	% chge
Corporate Securities	$ 61.3	$ 1,113.9	$ 1,113.9	0
State and Municipal:				
Excl. Housing	44.2	671.4	671.4	1
Housing	23.3	250.6	250.6	47
Total Capital	$128.8	$1,435.9	$1,435.9	19

Cheap Repairs For Damaged Bridges

Flame-straightening does this in the Pacific Northwest:

- **Eliminates costly structural-member replacements**
- **Restores bridges without traffic interruptions**

Ray Bloomberg, ENR Correspondent

INCREASINGLY for the last 20 years, bridge departments of the Pacific northwest have been turning to Joseph Holt, of Seattle, in cases where steel bridge members have been distorted by accidents. Holt, who describes himself as the "originator of distortion control," almost invariably is able to straighten the member in place without closing the bridge to traffic. A V-shaped "heat," by an acetylene torch on strained steel, does the trick.

• **Burned bridge saved.** Holt's largest recent project was realigning 72 floor beams and two top chord members on a state highway bridge across the Snake River at Enco, Wash. The structure is a deck truss type except for a through cantilever section over the channel. The timber deck of the bridge was destroyed by fire Sept. 9, and the steelwork was warped so badly that the structure was thought to be a total loss. Since the bridge was on an important highway, however, and no alternate route was available, the department resolved to attempt to restore the bridge to use was traffic until a new span could be built.

The plate girder floorbeams, 28 in. deep with 10½ in. flanges were warped in fantastic manner. Some humped up in the middle while others took on compound curves. Upper flanges average 6 in. out of line. Lower flanges were deflected slightly.

As the first step in bridge restoration, Holt and his son, Fred, were called in to straighten the beams and struts, a project that required 25 days and cost the state less than $5,000.

Working 70 ft. above the water, using only an acetylene torch usually with a No. 6 tip, the Holts straightened beams as much as 5 in. out of line. Their only scaffolding consisted of three 6x12 planks and a light railing along one side of the bridge. This supported the acetylene equipment.

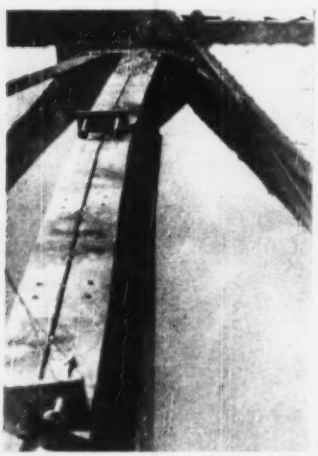
The two men initially worked astraddle beams. They would work on four or five beams at a time, applying V-shaped "heats" to each beam in turn while the others cooled. Mouth of the V in each case faced the side of the beam that needed to be contracted. Since the linear contraction as the metal cooled, was greatest at the mouth of the V, the beam would straighten in the desired manner, at the rate of about 4th in. per longitudinal foot of heated metal.

The heats were repeated until the beam was back in line. On the curves, these heats were placed about a foot apart. Occasionally, near the ends, where the beams had to be brought into a 90-deg. angle from the truss plane, as many as four or five heats were made at the same location. The average beam took about 20 heats, the minimum—where the beam was under no stress from the chords—four heats.

The most difficult beams were nearest a 10-in. buckle in the upper chord, which was 16½ in. out of line in a 50-ft. length. The nearest beam contained distortion stresses that caused it to move 2 in. the wrong way when Holt applied two small heats about the size of a quarter. To overcome this, Holt peened the beam on the out-curved side until it moved 2 in. inward; then he applied heats until the beam was straight.

Part of the work was observed by members of the University of Washington Engineering Experiment Sta-

BEFORE—A bridge near Roseburg, Ore. was twisted out of shape and severely damaged by settlement of the center pier during a flood . . .



FLOORBEAM of burned Snake River deck truss bridge was distorted. Same beam (r.) with chalk-mark amount of movement induced by flame-straightening.

tion, which has a project to study Holt's method of straightening. Preliminary tests at the university and also at Ohio State University indicate that the heating in no way damages the metal. In some cases, elasticity of the re-aligned steel is reduced but, in all cases, the straightened steel can carry more stress than it did before.

Another Holt project was straightening the twisted steel members of a flood-damaged Oregon highway department bridge near Roseburg. The upstream center pier column of the two-span continuous truss sagged at least 3½ ft, causing buckling among the top chord and bracing members. The bottom chord was broken at one end, some of the upper laterals were broken and about 100 steel members were bent or twisted out of shape.

In addition to raising the bridge and replacing the center pier, the highway department had the choice of replacing the damaged members at a cost of $40,000 or straightening them with the Holt method at a cost of $6,000. The department decided to replace two upper chord sections and three upper lateral sway frame pieces and have Holt finish the topside work.

The worst member to be flame-straightened was 42 in. out of place at its center point. In some instances, the natural stresses of the structure were enough to spring the bent member back to the original condition; in other cases, outside force was applied by hydraulic jacks.

• How he does it—Holt applies heat to about 1,000 deg F., producing a light red color at the apex of the V, progressing gradually outward toward the mouth of the V, weaving the torch in ever broader strokes. He cautions that there must be "metal cold enough, strong enough and so situated as to force the heated metal to upset, unless some outside force can be added to force that upsetting action. The structure also must be analyzed to determine whether the member is under tension or compression, as untold damage can be done if these forces are ignored."

Test results indicate a 1-1½% loss in elongation but increases in yield point, load and tensile strength.

"Steel contracts on cooling as much as it expanded on being heated," Holt points out. "This is true in volume but not in alignment or length, if the heat is properly applied. It is up to us to apply the heat in the proper way to straighten, bend or shorten the steel member to meet our needs."

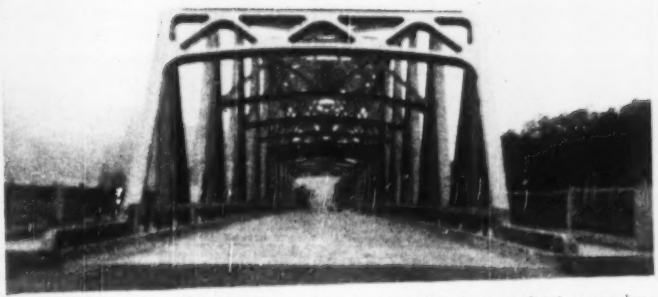
Ordinary members of mild steel need no reinforcement unless subjected to excessive stresses. Reinforcing is advisable, however, where heat treated steel is re-aligned, says Holt.

Holt has used his method on bridges to straighten portals, batter posts, struts, laterals, verticals, wind braces and chords, all without removal from original positions.

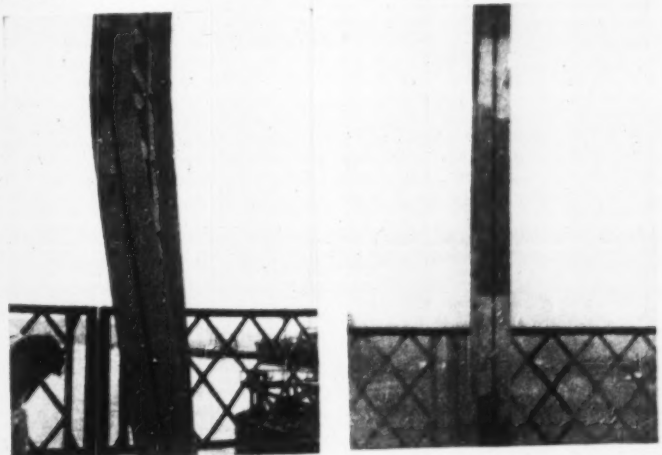
When there is stress on a member that is being heated, the stress must be relieved if it is of an amount sufficient to elongate the metal while it is hot. Sometimes where internal stresses exist, as in power shovel dipper sticks, the first heat only relieves these stresses and a second heat is required to do the pulling.

• Wrecked truck repaired—Truck frames often are bent from overloading, ruts in the road or collision. In one case handled by Holt, a truck was hit head-on while carrying a full load. Its frame was bent downward as well as sidewise just back of the cab, so that the front end of the frame was 15 in. out of line on the vertical and 8 in. out of line on the horizontal plane. There were several small kinks, and from the main bend toward the frame was diamond shaped, with double bends in the two front cross members.

After the truck had been stripped for necessary repairs to the cab, engine and transmission, Holt removed the two channel cross members, which already were loose, and heated them so as to bring them straight on the horizontal. One had to be heated on the flanges, starting at the web; the other, being bent the opposite way, had to be heated on the web. To bring the channels in line on the vertical, the top flange was left cold, the heat starting on the web next to it and widening out toward the bottom, and the bottom flange heated to the same width as the heat at the bottom of the web. A hammer was used only to flatten the web or flanges where they were kinked badly over short distances, and then with as little heat as possible. No force, other than contraction caused by the heat, was used to pull the frame back to its proper alignment. The frame was reinforced with a plate of mild steel ⅜ in. thick, placed inside the channel and held by welds on the edges, with rivets in existing holes.



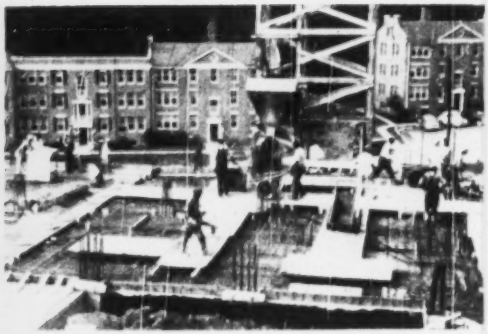
AFTER—Ready for traffic. The highway department replaced pier and a few members. Joseph Holt straightened more than 100 members for $6,000.



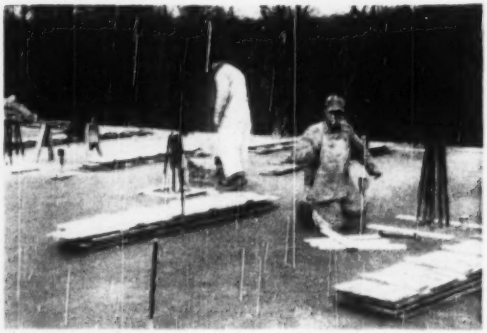
LOG TRUCK hit this vertical in West Bridge, Aberdeen, Wash.; bent the member in three places. Holt straightened it in two hours with acetylene torch and a hoist.

Flat-Slab Design Speeds Construction

1 Buggies carrying concrete for columns traveled on forms for flat-slab floors, not needing runways since . . .



4 Runways were laid. Hoisted concrete was dumped into a hopper, then fed to buggies and slab cast. Next day . . .



5 Column forms were erected for the next story, beginning with base nailed to slab to eliminate bottom bracing.

Concrete structures were completed eight weeks ahead of schedule on a 14-story apartment house that incorporates the first flat-slab floors without drop panels and column capitals in Washington, D. C. About 24,000 cu yd of concrete were placed in the superstructure between Aug. 15 and Feb. 12.

The contractor credits simplified formwork, made possible by the flat-slab design, fast setting concrete and early construction of gravel roofs to save the job.

There are two buildings in this $5,000,000 project, known as the Quebec House Apartments. The first to be completed contains 360 rental units, the other 200. Both will be completely air-conditioned, each apartment having individual controlled units to which hot and cold water will be piped.

• **Buildings fitted to site.** The site is on a steep slope. To take advantage of this, the architects fitted the structures to the contours so that they would conform to the hillside, the buildings satisfy maximum permissible height requirements of the city code.

Quebec House No. 1 consists of three 65-ft wide wings, each a little over 200 ft long, joined in the shape of a T. Two of the wings follow the contours along the higher portion of the site, the third along a lower level. Nevertheless, because of the steepness of the slope, there are eight stories above the main entrance and six below.

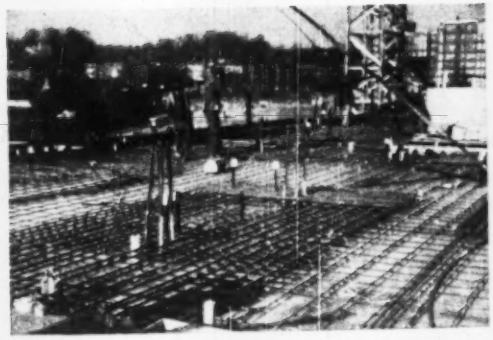
• **Flat-slab floors.** The building is of reinforced concrete with flat-slab floors generally 6½ in. thick throughout. It is cut by three 2-in. transverse expansion joints located between columns, so that the slabs are cantilevered to the joints.

Columns are spaced from 12 to 20 ft apart and have no capitals. Instead, slab reinforcing steel is concentrated over the columns to permit higher shear stress.

Design of slab steel in areas distant from the columns was controlled by city code requirements for minimum steel based on a percentage of gross concrete section. Reinforcing bars are spaced 5 or 10 in. apart. Bottom bars are mostly ¾-in. rounds, top bars ⅝ or ¾-in. rounds. About 95% of the steel is straight.

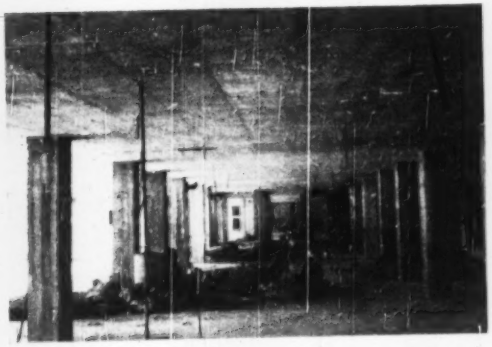
The slab was designed as an elastic, continuous frame to support a combined live, dead and partition load of 140 psi, assuming 2,500-psi concrete. As a check, it was also investigated by several methods: Difference equations of Henri Marcus, differential equations of A. Nadai, infinite trigonometric series of V. Leve, replacing circular plate, and coefficients of the Washington building code. All methods give about the same results.

Spandrel beams are wide and shallow, 40 x 9½ in. deep, to meet the city code requirement that the front of the spandrels must project to within 3 in. of the face of the wall for a 9-in. brick wall. The width of the beams was chosen so that the largest size column



2 Drop panels and column capitals were eliminated. Reinforcing is concentrated over columns and . . .

3 Stirrups for 40-in. wide spandrels extend into slab to serve as top steel also. After steel was placed . . .



6 Under side of the flat slab, which can be painted to form a ceiling, is shown for a typical story in . . .

7 Quebec House No. 1, which has 8 stories above the main entrance (left), 6 below. (Photos by Jacob Feld)

would be 2 in. inside the spandrel. Stirrups, spaced generally at 7'0 in. centers, reinforce the beams against torsion and are extended to serve also as top steel for the floor slab.

• **Design speeded concreting** This flat-slab design greatly simplified formwork requirements compared with conventional beam-and-slab construction or flat slabs with drop panels. Here is how a typical story was formed and cast.

Plywood for the slab forms came to the job in 4 x 10-ft panels and was cut to 2-ft widths, which the men could carry under their arms. The forms were nailed to 3" x 4"s carried on patented adjustable shores supported on the floor below. Then, the column concrete was placed, the slab forms serving as a runway for the buggies. This saved an operation—for beam-and-slab construction, the contractor would have had to build a runway. After column concreting was completed, reinforcing steel, piping and conduit was placed, runways were laid for the buggies, and finally the slab concrete was cast.

Concrete was poured in the morning. Crews averaged between 200 and 220 cu yd of concrete each morning, about one-third of the 39,000-sq ft floor.

The concrete, mixed in transit, was quick-setting. The contractor used 7 or 8 bags of cement per cubic yard, and 1 or 1½% calcium chloride, depending on whether the temperature was above or below 70 F. As a result, the finishers were able to complete their work by 4 pm, eliminating the overtime pay and night lighting that would have been required with slower setting concrete. Also, the layout men could start work that afternoon on the next story.

• **Form bracing eliminated** The following morning, erection of column forms began. First step was to nail four 1-in. boards to the concrete slab around the perimeter of each column. These eliminated the need for braces at the bottom of the form, which was made up of boards.

The high early strength of the concrete enabled forms to be stripped in six days. However, the Washington code requires that after November 1 concrete floors of this span must be supported for 21 days; hence, about every third or fourth plywood panel was left shored up, as required.

Quebec House No. 2 is similar in design to No. 1 and is being built by the same methods.

Apex Construction Co. is the general contractor, with R. N. Fleming in charge. S. D. Moses Construction Co. is the concrete subcontractor, John T. Edmunds is concrete superintendent on Quebec House No. 1 and Raymond G. Cure on No. 2.

Architects Edwin Weihe and Katherine Gibbs, of Washington, D. C., designed the Quebec House Apartments. Jacob Feld, of New York City, was the consulting engineer on structural design.

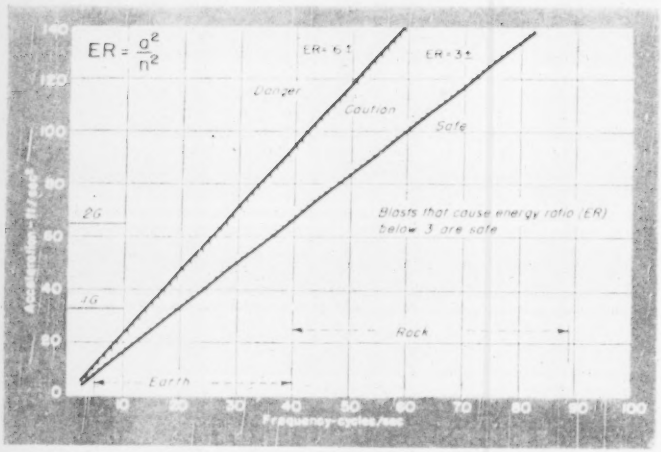
A contracting problem solved by insurance company's research

Will My Blasting Damage Property?

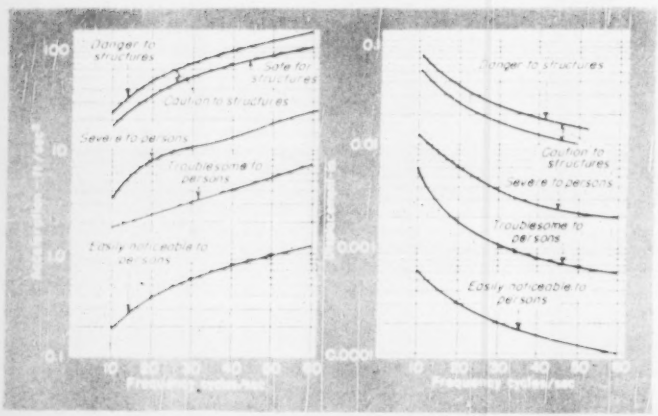
The contractor asks: "How big can my shots be without busting that building?"

The Property Owner asks: "Will that contractor's blasting damage my building?"

A quick answer to the property owner is: "Your building should stand five times the shock that will scare you." This answer and an answer to the contractor's query result from research by Liberty Mutual Insurance Co., Boston, reported by T. J. Crandell, assistant vice president, in the Journal of the Boston Society of Civil Engineers, April, 1949.



ENERGY RATIO limits for various acceleration-frequency relationships, showing how the caution zone (ER = 3 to ER = 6) broadens as frequency increases.



HUMAN RESPONSE to vibration, compared to structural response (left) for various acceleration-frequency relationships (right) for displacement-frequency relationships.

The answer to the contractor is a bit more complicated. A safe charge delivers an energy ratio (*ER*) less than three at a building. *ER* is a function of acceleration (*a*) and frequency of vibration (*n*), which in turn depend upon the explosion-to-building distance (*D*), the weight of explosive (*C*) and a ground transmission constant (*K*):

$$ER = \frac{a^2}{n^2} \quad (1)$$

$$ER = \left(\frac{2a}{D}\right)^2 C^2 K \quad (2)$$

$$\frac{a^2}{n^2} = \left(\frac{2a}{D}\right)^2 C^2 K \quad (3)$$

A safe charge is computed with (2) by giving *ER* a value of 3 and solving for *C*.

The constant, *K*, ranges from .001 (hard rock) to .008 (swampy ground). It is obtained by first placing an accelerograph 50 ft from a known explosive charge, then detonating the charge. Weight of explosive (pounds), distance (feet), acceleration (feet per second squared) and frequency (cycles per second) are substituted in (3), which is solved for *K*.

The accelerograph, an instrument that was developed for this research, records frequencies and relative amplitudes in three planes. Amplitudes are translated into acceleration (*a*) for use in computing *K*.

K also can be computed with frequency-displacement data obtained from a portable seismograph. The formula in this case is:

$$16\pi^2 D^2 = \left(\frac{2a}{D}\right)^2 C^2 K \quad (3a)$$

in which *D* is displacement, in feet.

Charges based on the formulas are sufficient to break up effectively the materials encountered in this research program.

• **Tests that led to answers.** The formulas are empirical, based on blast-seismograph distances of from 25 to 250 ft, and charge weights of from 1 to 100 pounds. In all cases the instrument was on the ground surface or in buildings. In each test series, either the distance or the weight of explosive was constant. The effect on structures was a matter of observation, supported by the literature of other research.

Human response data came from other research.

Instrument readings showed that frequencies as low as seven cycles per second occur in swampy ground; 20 in hard clay and approaching 90 in the hardest rock. The first chart shows how acceleration can increase as frequencies become greater, in accordance with equation (1). Also how the margin of caution broadens as the ground gets harder. The caution zone lies between an ER of 3 and an ER of 6. The ER of the destructive earthquake that shook Long Beach, Calif., in 1933, was 9.0.

• **Delays don't build up effect**—The possibility of one-second delays creating a cumulative effect on structures was investigated and found to be nonexistent. The characteristic shock wave reaches maximum amplitude in the first few cycles, then quickly dimps out. Hence, under the least favorable conditions a single blast's effect terminates during the delay before the next charge goes off.

However, when by accident two delays let go at once, the effect is four times that of a single delay (the weight of charge is a squared quantity in the ER equation).

For example, in one test there was a simultaneous blast of enough delays to run the ER up to 10 at the accelerograph 50 ft away. Canned goods were knocked from the shelves of a grocery 75-100 ft away.

The statement that a building will stand an ER of 3 is qualified by the requirements that the building be of average workmanship and materials, and that no pre-stressing exist. Foundation-wall settlement cracks, which indicate prestressing, will widen under the further stress of an ER equal to 3.

• **Owner's reaction to vibration**—The vibration causing an ER of 3 is 100 times the vibration that a human can feel; moreover that larger vibration is five times the one that has a severe effect on persons (see second chart). Thus is the reason for the property owner's concern when the contractor sets off a maximum safe blast. (And it explains the owner's tendency to claim damages that aren't the contractor's fault.)

Part of the severity to persons is due to surprise. The contractor can counteract surprise by warning property owners of a blast's imminence. He also can obtain better owner cooperation by informing the owner that tests have been made to determine the ground constants, so that blasts are limited to insure safety to ordinary structures in the area.

(Copies of Mr. Crandell's paper, "Ground Vibrations Due to Blasting" may be obtained by request from Liberty Mutual Insurance Co., Boston, Mass.)

MILLI-SECOND DELAYS DON'T COMPLICATE THE PROBLEM

F. J. Crandell
(Author of paper abstracted above)

Since the publication of this paper, we have had some opportunities to measure ground vibration due to blasting in which the new milli-second delays were used.

Record No. 9 shows ground vibration resulting from the detonation of 9 lb, 25½ lb, and 19½ lb of dynamite respectively, using milli-second delays as the firing element.

Points 2, 7 and 4 show the ground vibrations due to shooting of 5 lb, 25½ lb, and 20 lb, using ordinary instantaneous caps.

A visual comparison shows that the milli-second delays, although giving a continuous vibration, produce ground energy ratio in proportion to the number of pounds exploded per delay and thus allow a precise control of ground vibration, the same as was found using ordinary delays.

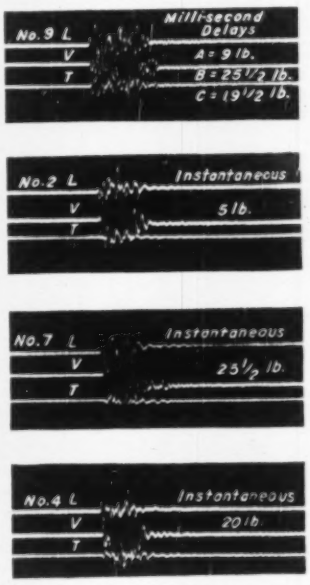
Moreover, there is evidence that at certain ground frequencies proper use of milli-second delays may further reduce the peaks of vibration curves.

This evidence is found in controlled tests by the Bureau of Mines, showing the possibility of reducing ground vibration by phase interferences. Tests were as follows:

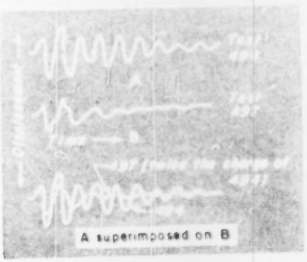
"Small charges were fired 30 ft from the recording station, which comprised three mutually perpendicular seismometers.

"First, a single shot was fired and the vibration recorded. The frequency of one horizontal component was fairly constant, as shown by test 4/4, A. The firing apparatus was then adjusted so as to have a time delay equal to a half period of the vibration.

"Two charges, each equal to the charge of test 4/4, were then fired at the same spot with the time delay between them. The resulting vibration record is shown in test 4/7. Although the vibration along the component being considered is not eliminated, a substantial reduction is apparent. (A superimposed on B), especially when it is remembered that the weight of shot 4/7 was twice that of shot 4/4."



VIBRATION RECORDS comparing milli-second delay blast effects with instantaneous effects. "L," "V," and "T" indicate vibration in longitudinal, vertical and transverse planes.



PHASE-INTERFERENCE test conducted by U. S. Bureau of Mines.

Milli-second delays have available time intervals of .025, .035, .040 sec. If the ground frequency is 20 cycles per sec. (period (P) = .05 sec.) then ½ cycle is .025 seconds.

at 20 cycles per sec., P_1 = .05 sec.;
1/2 P_1 = .025 sec.
14.3 cycles per sec., P_2 = .070 sec.;
1/2 P_2 = .035 sec.
12.5 cycles per sec., P_3 = .080 sec.;
1/2 P_3 = .040 sec.

After finding the ground frequencies by tests, it appears probable that the judicious use of these short interval delays can further reduce and control ground vibrations due to blasting.

Graphic Method for Determining Widening Of Navigation Channels at Bends

T. G. Thorgeson
Engineer, Jacksonville District
Corps of Engineers, Jacksonville, Fla.

Various concepts have been developed in this country and abroad for mathematical determination of the widening required at bends in navigable rivers and canals, but they are complicated and vary with navigational use. Equally satisfactory results can be obtained by the graphical method described here. The method was evolved in the writer when charged with responsibility for speeding the amount of widening at bends in the St. Johns River channel between Palatka and Sanford, Fla., when that channel was dredged recently. The method is much simpler than the mathematical method and errors are less likely to creep in.

Prior to applying the graphic method for determining the extent of a bend widening, the approach channels to the bend and the channel around the bend are laid out on the survey map, on which have been plotted sounding, probing to rock, range lines, and other topographical information. A channel layout then is selected that is most feasible and economical from the standpoint of navigation, original construction cost, and future maintenance cost.

The accompanying drawing shows one of the bends in the St. John's River that was laid out in this manner, but only the shore lines are included, to avoid confusing details. For navigation purposes a minimum radius of four times the width of the proposed channel is desirable for curves, and simple curves are preferable from the standpoint of layout. However, it sometimes is necessary to resort to compound curves to fit the natural bank contour.

Having laid out the center line so that it meets the criteria set up for the proposed channel, the first step in a graphic determination of the widening that will be required is to select the total length of tow, including the tow boat, that is using the channel or likely to use it.

The length of tow is determined from a study of local conditions, such as width and depth of channel, type of commodities transported, and equipment used or likely to be used in transporting the commodities through the navigation channel. The St. John's River project between Palatka and Sanford, as authorized by Congress, provides for a channel width of 100 ft and a depth of 12 ft, with widening at bends if necessary. The study indicated that for the proposed channel the probable maximum length of tug and tow will be not over 600 ft, composed of 4 to 6 barges from 60 to 100 ft long. For a maximum length tow we might have

5 barges, 80 ft each	400 ft
Tug	50 ft
Tow line	150 ft
Total length of tug and tow	600 ft

The barges used in a 100 ft wide channel are generally not more than 30 ft wide. We used a 40 ft maximum width, which is 10 ft less than half the channel width, and we used this 40 ft width of the whole tow, including tug and tow line, as an additional factor of safety.

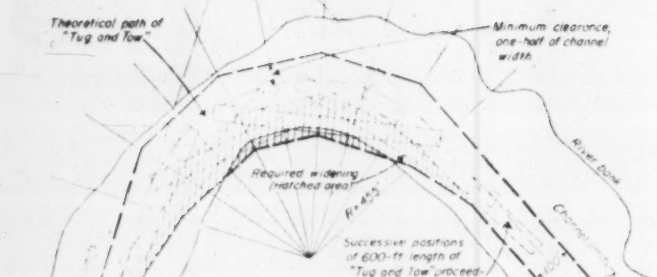
The next step was to make a cardboard model of the "Tug and Tow" to the same scale as the plan of the bend under study.

Because engineers operating under the U. S. Coast and Geodetic Survey in their guide, it was safe to assume that the tug captains would follow the center line of the channel as closely as possible, maneuvering their tows around curves in such a way as to keep within the outer and inner channel "limits." Consequently, as the model "Tug and Tow" was advanced around the bend in successive steps, each end of the model was kept centered on the channel center line.

One half the channel width was used as the minimum clearance from center line of channel to channel edge for the long or outer side of bend, thus maintaining the normal channel on the other side. For the short or inner side of the bend the limits were established to fully clear all positions of the model "Tug and Tow." Some additional clearance may be allowed at deemed advisable for the project in hand. The minimum requirement, plus necessary clearance to make a straight line channel limits, was used in the illustration, as this was considered ample for the project.

It will be noted that although the path of the tow navigating a bend is curved, the channel limits are made straight. This is done for simplification of:

1. Computations for horizontal control, and for dredging quantities.
2. Field layout marking the channel to be dredged.
3. Original dredging and future maintenance dredging.
4. Placing navigation aids.


Theoretical path of "Tug and Tow"
Minimum clearance, one-half of channel width
Required widening (hatched area)
River Bank
Channel limits
Successive positions of 600-ft length of "Tug and Tow" proceeding around bend
River Bank
100 0 100 200 300
Scale in Feet

AMOUNT OF WIDENING at bends in navigation channels is determined by moving an outline model of the longest anticipated "Tug and Tow" around the curve, keeping the ends of the model centered on the plot of the mid-channel line. The same procedure is followed on shorter curves and at the intersections of tangents where no curve is required in the channel.

Once the criterion is established governing the maximum length of "Tug and Tow" using or likely to use the channel, and is applied as described, a consistent channel is obtained that can be uniformly navigated with the same ease throughout its entire length, be the bends sharp or broad, short or long.

By using a rigid "Tug and Tow" an ample factor of safety is provided due to the fact that this condition would obtain only for a single vessel of maximum width and length of the "Tug and Tow" used. In actual navigation conditions the tug, tow line, and barges are not as wide as indicated, and in navigating a bend the combined non-rigid tug and tow will swing in a curve approaching the theoretical path of tow shown on sketches. This provides for some shoaling along the channel edges between maintenance dredging operations, and for tows passing in bends. In extreme cases, when two maximum tows meet in a bend, one or both tow lines can be shortened, in which event there will be ample clearance for both to proceed without stopping.

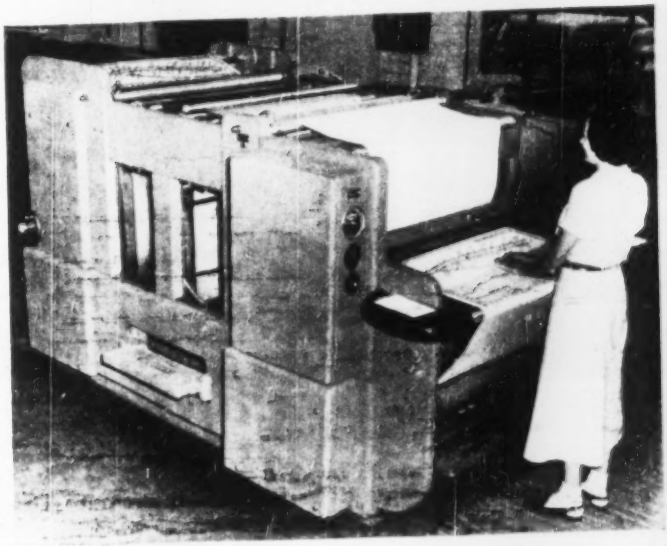
It is believed that due to its simplicity, the use of this method results in a considerable saving (1) of time in channel layout work in office and field, and (2) in excavation quantities due to the fact that no guess work is required in determining the minimum excavation necessary to produce the desired consistent results.

Print Machine Speeds Road Planning

TO SPEED a cooperative zoning program, the Virginia State Highway Department has installed automatic equipment for processing photographic reproductions of drawings. The state is thus spending less time and less money, and getting its zoning plans approved faster.

With the equipment believed the first of its type for this use in the U.S.—positive photographic reproductions of highway plan and profile drawings are made at a rate of about four linear feet per minute. The method is said to save more than 65 percent of man-hours by comparison with conventional methods.

The need for such reproductions arose last year when work began on the state's new primary highway zoning program. The Department of Highways and the Planning and Economic Division of the State Conservation and Development Commission set up a joint committee on zoning, to present the facts on the value of highway zoning to county officials. With the approval of the county officials, ultimate right-of-way lines are being set up for all primary highways in each county. Based on long-term estimates of future traffic, these ultimate right-of-way lines are used by the boards of supervisors to set up new zoning ordinances, and these ordinances are expected greatly to reduce the cost of acquiring additional right of way as highways are widened.



POSITIVE PRINTS OF DRAWINGS used in zoning along Virginia highways are reproduced directly from originals in this machine.

• **New plans needed.** Because existing highway plans were already overcrowded with details, separate sets of plans were needed to put the program into effect. Permanence was a prime requirement, and this led to the decision to reproduce plans photographically.

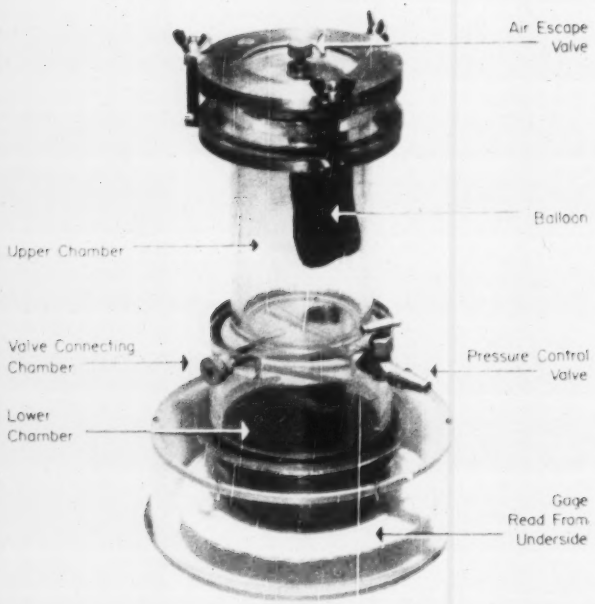
Granville A. Duke, head of the department's blueprint section, undertook an investigation of reproduction materials and methods. The investigation led to the purchase of automatic equipment suitable both for blueprinting and for processing photographic reproductions on a new type of photographic paper.

• **No negatives.** Unlike conventional photographic materials, this paper produces a positive copy directly from a positive original drawing, without a negative, and may be used in normal room light. The paper is rolled into the machine, exposed to a high intensity light source, and processed as it passes through tanks of photographic solutions. The operator simply places the original drawing on the photographic paper and the finished print, dried and ready for use, emerges from the machine in a matter of minutes.

Paper speed is constant, and exposure is adjusted by regulating the light source to yield top-quality reproductions from originals of varying contrast and line density. Good results are obtained not only from ink originals on cloth, but also from pencil drawings on either cloth or vellum. As a test of permanence, a section of a machine-processed print was tacked on a board and placed on the roof of the Highway Department's headquarters in downtown Richmond. Unprotected, and so positioned that it was never in shadow, the print was exposed for 35 days, during which 6.8 in. of rain fell and more than 200 hours of sunlight were recorded. No difference could be detected between the exposed part of the print and other portions which had not been exposed.

Once the photographic reproduction has been made, existing right-of-way lines may be removed with a two-solution eradicator and the new lines drawn in with ink or pencil.

The machine was developed by the Eastman Kodak Co., Rochester, N. Y.



For Soil and Snow Studies . . .

The Volumeter

Quickly Measures Volume By Indicating Pressure Drop

The VOLUMETER, a compact device invented by John E. Shea of the Engineering Research and Development Laboratories at Fort Belvoir, Va., for quickly finding volume, specific gravity, moisture content and density of soils and hard packed snows, has been developed to fill the need for an accurate means of getting snow density, the volumeter already has proved itself for many rapid tests on soil samples.

Its principle is Boyle's gas law:

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

Since the test is completed at a constant temperature, the T values drop out, and since the only measurement made is one of change in pressure, no absolute quantities are involved, and only gage pressures need be considered.

In effect, the device does this: It permits a volume of air under a given pressure to increase in volume and records the resultant pressure drop. The change in pressure is a function of the volume of air, which, in turn, depends on the volume of sample material in the air chamber. By measuring pressure drops for several known volumes, Mr. Shea has calibrated the pressure gage to read directly in cubic centimeters volume of sample.

• **Its use.** Here is how you would use the volumeter. Place the sample to be measured in the upper chamber, and raise the pressure there from atmospheric to 15 psi gage with a hand pump. Then, open the connecting valve between chambers, permitting air to expand into the lower one. The pressure drop accompanying expansion actuates the pressure gage needle, moving it from 15 psi to some lower value. But since the dial is calibrated in volume of sample, you read your answer directly.

Find specific gravity by dividing dry weight of the sample in grams by the volume in cubic centimeters just found.

Then, knowing the surface dry specific gravity of a given sand or coarse aggregate, you easily can figure the weight of excess moisture in a wet sample of the same material.

Let x = weight of moisture
z = dry weight of sample
G = specific gravity of dry aggregate

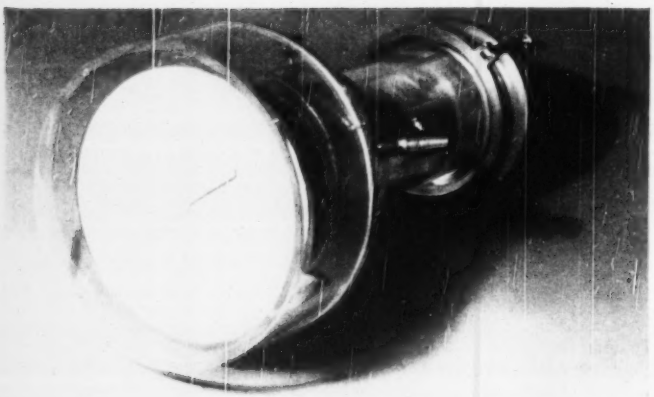
Then $z + x$ = total weight of sample in grams

$\frac{z}{G} + x$ = total volume of sample in cubic centimeters

You can find the total weight on a scale and the total volume in the volumeter, then solve the above equations simultaneously for x, the weight of excess moisture.

Field moisture by volume can be found the same way, using the absolute dry specific gravity determined as above or an estimated specific gravity based on knowledge of soil types. Assumption of 2.65 specific gravity for most soils would result in a small error in moisture content computations.

In clay or other cohesive soils which



GAGE NEEDLE responds to pressure, dial reads directly in sample volume.

cannot be penetrated by air, the sample may be made into a slurry by adding measured quantities of water. After the total volume of slurry is determined, the volume of water added is subtracted, and the moisture content then determined as above.

Bitumen content of a bituminous mix can be determined in much the same manner. If *y* is the weight of bitumen present and *x* is the weight of aggregate, plus any moisture present, the simultaneous equations will be—

$$x + y = \text{total weight of sample in grams}$$

$$\frac{x}{G_1} + \frac{y}{G_2} = \text{total volume of sample in cc}$$

where G_1 is specific gravity of the dry aggregates, and G_2 is specific gravity of the bitumen. Generally, G_1 and G_2 will have been established previously.

• **Density determination**—When it's density you want, put an undisturbed sample in the rubber balloon fitted to the neck of the sample chamber. Use the hand pump to exhaust air from the space between the chamber walls and the balloon through a pressure exhaust valve. The balloon will expand, and you can put any reasonably shaped lump sample inside it. Then build up pressure in the sample chamber to 15 psi. The balloon will tightly upon the sample, forcing any excess water in sample and balloon out to an escape valve in the chamber cover. Finally, open the connecting valve between chambers and read the sample volume (voids included) on the dial. Divide this volume into the sample's weight and multiply by 62.4 to get density in lb per ft.

The gage is calibrated for a plain flat cover and no balloon, so a small correction must be made in the dial reading to account for a change in volume in using the special cover for density determinations.

• **Method of calibration**—The calibrate his dial so that sample volumes could be indicated by a pointer reacting to pressures, Mr. Shea made a series of standard volumes ranging from 100 to 600 cc in about 50 cc increments.

First, he applied the 15 psi pressure to the upper chamber with the volumeter empty, opened the connecting valve between chambers and observed where the pointer stopped after the pressure change; this was his zero volume reading. Then with the 100 cc standard in the volumeter he repeated the operation and made the 100 cc mark on the dial where the pointer stopped—and so on up the scale with the other known volumes.

As each volume increment was added, the pointer swung through an arc on the dial. These arcs may be measured by their chords L, L, L, etc., and Mr. Shea found that a plot of the square roots of these chord lengths vs their corresponding volume increments approximated a straight line. From this line (L vs V), he was able to pick off chord lengths for intermediate volumes and locate those volumes on the arc of his dial.

Tests with the pilot model have shown it reliable on samples with volumes below 500 cc. But, inserts of known volume can be put in with smaller samples to bring the total volume up into accurately measurable range. The known volume must then be subtracted from the dial reading to get the volume of the sample being tested.

For maximum precision in determining volumes of his standards, Mr. Shea used a water displacement method. He collectively immersed the standard volumes in a tank of water and determined what total volume of water they displaced; this figure was found six times and the mean was taken as the total volume. This, divided into the total weight of the eleven samples, gave the specific gravity of the plastic material of which they were made. Then the weight of each individual sample divided by its specific gravity gave its volume.

Improvements in the device to make it more compact, rugged and portable for field use and the development of further quick field tests employing its principle are currently under study at the Engineer Research and Development Laboratories at Fort Belvoir.

Machine Lining Applied To Large Pipe

PLACING MORTAR LINING by machine in large diameter (120 in.) pipe is under test on the Los Angeles aqueduct. Largest pipe previously lined by these machine methods was a 60-in. line in Boston. However, machine lining has usually been restricted to much smaller pipe.

Conditions of the test were far from ideal. The test section involved riveted steel pipe that was in some instances out of round as much as 8 in. Rivet heads and bulges in the pipe tended to throw the lining machine off stride. In spite of these obstacles, mortar lining by machine in large size pipe was successfully accomplished.

The 1-in. thick mortar lining is intended to prevent continued corrosion of the pipe. Comparisons will be made with other linings as to cost, smoothness, and dependability. The test section will be checked from time to time to determine bonding qualities, occurrence of cracks and effectiveness of the lining in thin shell pipe subject to repetitive deformation.

Equipment was developed by the Centrifuse Corp. of New York and the American Pipe and Construction Co., Los Angeles, Calif. The method has been successfully used on smaller diameter pipe including some on the Los Angeles water distribution system. (ENR Oct. 17, 1946, vol. p. 500.) Except for size, primary difference between the new and older machines is in the number of travels. Machines for smaller pipe used two or three travels, depending on pipe size and quality of finish desired. Only one travel, rotating on a long arm is required in the new machine. Keeping equal pressure on diametrically opposed travels in pipe subject to deformation ruled out more than one travel.

A 1:1½:3 cement-mortar lining was placed in a 10-ft dia section of the Los Angeles aqueduct by this machine. Only one rotating arm was used for troweling.

The mechanical trowel arm follows immediately behind a high-speed impeller head. This head throws the mortar against the pipe wall by centrifugal force. It is geared to a traveling carriage so as to secure uniform thickness of lining. The trowel arm is also geared to the impeller head, and the entire assembly is centered on the pipe axis.

• **Yard tests first**—The machine was

first tested in the Mojave yard of the aqueduct on two sections of riveted pipe, one 8 ft and the other 10 ft in diameter. These tests demonstrated satisfactory bonding properties of the cement mortar as well as the ability of the lining to withstand severe deformation with only minor damage.

To arrive at these conclusions, the lined specimen was placed under loading that produced a maximum deflection of 9 in. in the 8-ft dia pipe. Cracking of the lining under this severe loading resulted, of course. However, none of the cracks was more than 0.01 in. wide, and most were fine hairline cracks that closed completely when the load was removed and the pipe resumed its original shape. There was no loss of lining during this test, and subsequent removal of portions of the lining indicated generally good bond with exceptionally strong, hard mortar.

Based on the general success of the yard tests, water department engineers decided to line 1,600 ft of the Antelope siphon pipe with a 2-in mortar lining. Although this 1,600-ft section of pipe will not be unwatered again until October, aqueduct engineers think that the yard tests indicate the efficiency to be expected.

Plate thickness of this steel pipe is only ¼ in. Therefore, first step was to bring exterior backfill against the pipe up to a point 18 in. above the spring line. This was to hold the empty pipe as nearly round as possible.

The exposed portion of the pipe was sprayed continually with water to decrease temperature on the inside of the pipe and thus minimize humidity loss.

Cleaning consisted of the removal of scale, tubercles and dirt by mechanical rotation of chain links followed by subsequent hand brooming. Scale and tubercles in and around riveted joints were removed by hand.

Mortar was one part pozzolan, four parts portland cement and six parts of clean, well-graded sand passing a No. 16 sieve. The resulting mortar was very plastic and workable. Ultimate 28-day strength was close to 5,000 psi.

No particular difficulty was experienced in placing the lining but considerable difficulty arose in troweling it to keep within the maximum allowable variation in lining thickness of plus or minus ½ in. The mechanical trowel arm was subject to natural vibration that, once started, caused rippling of the finished surface. Some time was lost in trying to overcome this difficulty, but it was never eliminated entirely. The out-of-round condition of the pipe was almost entirely responsible for the rippling.

The ripples were longitudinal with the pipe and any single such ripple, or wave, was about 12 in. long or about the length of the steel trowel. They varied in depth up to a maximum of ¼ in. The larger undulations in the lining were removed in follow-up hand finishing. However, the great majority of these irregularities were not of sufficient consequence to require removal.

• **Curing conditions**—The minimum curing period was five days before the pipe was refilled with water. During this time, ideal curing conditions obtained inside the pipe. The water spray on the outside of the pipe kept the inside cool, and while the placing machine was operating, a heavy fog filled the pipe—particularly near the machine. This fog condensed on the walls of the pipe aiding the curing. However, it had to be swept off the pipe ahead of the placing machine to prevent adverse effect on the water-cement ratio of the mortar.

The mechanical lining operations were followed up by hand finishers who dressed up around rivet heads, finished areas where the pipe plate was too badly buckled to allow mechanical troweling and rough spots.

Improvement of hydraulic characteristics of the pipe was only secondary to protection of the steel. However, piezometric taps were provided to observe the effect of the lining on flow coefficient. Results showed that the slope of the hydraulic grade line through the lined section was reduced to about half that in the remaining portion of the steel pipe where no work had been done. Value of Manning's "n" was reduced from 0.0176 to 0.0125.

This test program was conducted by the Los Angeles Department of Water & Power, Samuel B. Morris general manager and chief engineer. General supervision of the work was under Burton S. Grant, assistant chief engineer of waterworks, who was represented on the job by R. V. Phillips.

Contractor was the American Pipe & Construction Co. represented by Robert C. Sargent, manager, Centriline Division. The contractor is a licensee of the Centriline Corporation of New York.

Tests With Wood Reinforcing Bars

FROM HUNGARY comes a report on tests of concrete reinforced with wood. Here are conclusions of the studies made: (1) Wood is an effective reinforcing material. (2) decay of wood properly embedded in concrete is not probable. (3) wood-reinforced, precast concrete piles are less breakable under the hammer than those with steel.

These conclusions were drawn and reported to ENGINEERING NEWS-RECORD by Charles Szechy, chief engineer of the highway bridge department in Hungary's Ministry of Transport. His experiments included actual installations of wood-reinforced concrete structures. Example: a 30- x 13-ft. caisson in which a 70 percent saving in steel was realized by using wood.

In design of test beams, concrete and wood were assumed to have the same modulus of elasticity, concrete was allowed a 5,000 psi compressive stress, and design tensile strength of the silver fir used was set at 2,000 psi.

Most beams tested failed, due to direct tension rupture of the wood reinforcing; compressive stress in the concrete averaged about 4,000 psi at failure of the wood. Slip of bars was prevented by use of steel stirrups.

It was found that wood longitudinal reinforcing could even be placed completely outside the concrete below the bottom of the beam—without serious slippage, if properly tied in to the concrete with steel stirrups. However, fewer stirrups were required when wood was within the concrete.

To prevent swelling of wood, reinforcing was pre-soaked.

Bond was measured at 100 psi. before the soaked wood began to dry and 15 psi.—a nearly insignificant figure—after drying.

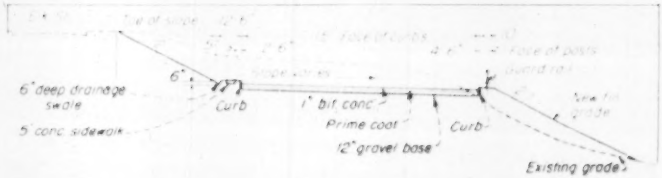
Concrete cover to prevent decay of wood reinforcing should be at least 1.5 times the thickness of the wood, according to test findings. This is considered sufficient for all indoor structures; use of wood reinforcing in structures exposed to severe weather conditions is not recommended on the strength of these early tests.

Since wood and concrete have nearly equal elasticity, piles precast of the two materials for a quay wall adjoining the Arpad Bridge in Budapest were found less prone to breakage in driving than conventional piles with steel longitudinal rods.

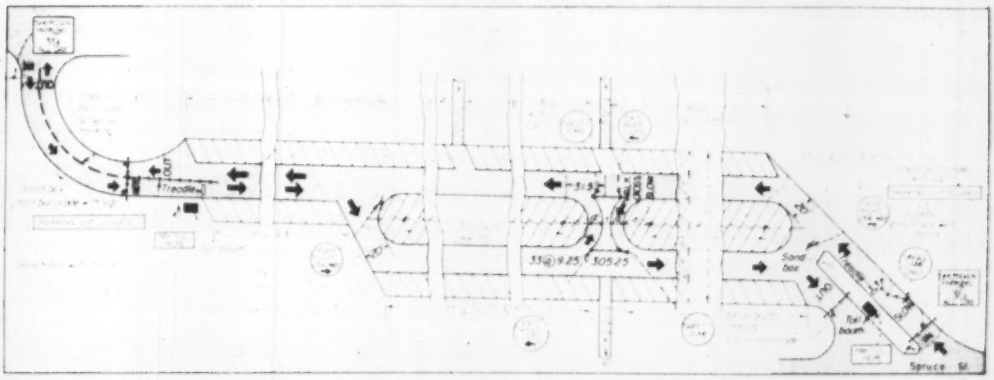
In precasting these piles, metal shoes were tied to the concrete by steel bars in the conventional way, but the steel bars were short and were replaced by wood for the greater part of the piles' length. Maximum length of the piles (20 to 25 ft.) was limited by bending resistance during handling.

Rebuilt playground, paved and marked for traffic control, solves problem of . . .

Parking in Congested Business Area



THE 115-LOT PARKING LOT is paved with bituminous concrete edged with concrete curbing. Top of the fill is protected with a studs guard rail.



AUTO TRAFFIC is effectively channeled in the 340-car parking lot by pavement marking and easily read direction signs. Cars entering the lot are automatically totaled by treadle counters.

capacity. Since the financial plan calls for 90% use for self-liquidation, the city is making up the difference; it is anticipated that use of the lot will increase this summer so that it will be self-supporting.

The playground on which the lot is built is located along the side of a narrow valley. To give two-end access earth excavated from high points was placed in 6-in. compacted layers over the playground to slope longitudinally from the upper to the lower street level. Short exit and entrance gradients are 6.1 and 5.7% while parking-space slopes are 3.3, 1.9 and 2.4%. Side slopes of the fill and cut sections are 2:1.

The eliminated play facilities have been replaced by a new wading pool nearby.

• **Traffic control**—In-and-out travel at the upper end of the lot is channelized by a centerline marking at the lower by a curbed island. Movement on the lot's 22.5-ft lanes is directed by large white arrows painted on the pavement and large signs on sturdy pipe posts at turning points.

Parking spaces in the two center islands and along the sides of the lot are also painted on the pavement in white. They angle in at 60 deg. Islands are 36 ft wide; side areas are 17 ft.

Toll booths, sand boxes and treadle car counters are located at the exit and west entrances. The counters automatically tally number of cars using the lot daily and thus check gate receipts.

The lot is only open from 7 am to 7 pm, and chain barricades carrying a sign "Parking Lot Closed" are provided to shut off both exit entrances.

• **Paving and drainage**—The parking lot is paved with 3-in. bituminous concrete over a 12-in. gravel base with prime coat. Pavement is edged with 9-in. concrete curb adjacent to the top of the fill and a 6-in. next to the cut section. Entrance and exit islands are delineated with 6-in. curbing.

Additional protection against brake-free cars rolling down the hill is provided by a guard rail between the higher curb and top of the fill. The guard rail has two 0.75-in. steel cables on concrete posts, spaced at 10 ft.

Adequate drainage is provided by a small ditch along the bottom of the section in cut and by catch basins connected to storm sewers at all low points.

Pedestrian traffic along the parking lot uses a 5-ft concrete walk parallel to and at the bottom of the inside cut section. Two concrete stairways extend from the lot to the upper level—Elk St.; another to the lower street level.

• **Personnel**—The parking lot project was carried out under the direction of Mayor Erastus Corning II by City Engineer Arthur L. Bush. It was designed by Parsons, Brinckerhoff, Hall and MacDonald, consulting engineers of New York City. Their representatives were C. A. Ziegenfelder and Julius Schilkensteid.

Notes on Legal Decisions

Summaries of decisions relating to construction prepared by I. Vernon Werbin, counselor at law and engineer, New York, author of Legal Phrases of Construction Contracts (McGraw-Hill)

No-Damage Clause in Contract

A contractor in Rhode Island brought an action to recover damages resulting from delays caused by the owner, the local housing authority, although his contract contained the following no-damage clause:

"No payment or compensation of any kind shall be made to the contractor for damages because of hindrance or delay from any cause in the progress of the work, whether such delays be avoidable or unavoidable."

The contract also provided that the contractor could obtain an extension of time in which to perform in the event he was delayed in the performance of the contract by the acts of the owner.[1]

The contractor was denied a recovery, the court holding that while ordinarily, where one exacts a promise from another to perform an act, the law implies a counter promise against arbitrary or unreasonable conduct on the part of the promisee. However, the no-damage clause in the contract expressly states that the contractor shall not recover damages because of hindrance or delay from any cause in the progress of the work "whether such delays be avoidable or unavoidable."[2] The court in its opinion stated:

"The language of this provision, though broad in scope, is not ambiguous. As the contract provides for an extension of time if requested by the contractor, it is obvious that the object of the clause was to protect the Housing Authority in an undertaking of such magnitude against the vexatious question, in perhaps innumerable instances, whether any particular delay could have been reasonably avoided by the authority. Had there been no such provision in the contract, the authority would have been liable on the principle of an implied covenant, if unreasonable delay were proven, that is, delay that might reasonably have been avoided in carrying out its part of the contract."

The contractor contended that this provision of the contract simply meant that the authority is excusable for reasonable delay only. As to this contention, the court stated: "This construction of the no-damage clause would subject the authority to the inquiry in all instances of delay whether a reasonable person would have acted differently, thus raising the very question that the clause intended to avoid. In the absence of any claim of concealment, misrepresentation or fraud, the contractor by such construction of the no-damage clause cannot render meaningless an express condition of the contract which it knowingly and freely accepted. As was said by the United States Supreme Court: 'Men who take million-dollar contracts for government buildings are neither unsophisticated nor careless'."

The court in its opinion further stated: "The parties to a contract are free to agree upon any terms that are not illegal. No-damage clauses similar to the one under consideration, which are most frequently found in construction contracts especially when they relate to public improvements, are not ordinarily in violation of law. We concede that such a clause if unambiguous calls for strict application but it cannot be treated as meaningless and futile, as the contractor attempts to do in the instant case." If a party to a contract with such a clause acts honestly within the fair and legal import of its terms, he cannot be deprived of the benefit thereof unless his conduct indicates bad faith or some other tortious intent, as every contract implies fair dealing between the parties. When viewed objectively by persons not in interest the conduct of a party under a no-damage clause similar to the one in the instant cases may seem arbitrary, and yet, as the trial justice apparently believed, such conduct in the circumstances here was nothing more than the honest exercise of reasonable caution."

---

[1] Pettis & Fitzgerald v. Housing Authority of Providence, Supreme Court of Rhode Island, Apr. 28, 1949.

[2] Wells Brothers Co. v. U. S., 254 U. S. 83, 65 L. Ed. 148.

FIELD AND OFFICE

Quick Maintenance

To aid the maintenance of the U. S. Air Force's Eglin Air Force Base at Panama City, Fla., post maintenance officers have developed trailers like the one above that are actually rolling shops for the various maintenance crews.

The trailer here is a quarter ton plumbing trailer, equipped to operate with lights at night and with a power take-off from either an adjoining building or a mobile power unit to enable use of the grinder, buffer and electric drill mounted on it.

In addition to a three day supply of parts for any type of domestic breakdown, the trailer carries a plumber's snake, closet auger, suction pump and four complete kits of tools.

The trailer and others like it are part of a development credited to Maj. Henry J. Stebling, air installations officer at the base.

THIS JOB-MADE RIG bends pipe in the field. Eccentric upside-down saddle on tractor side-crane holds pipe while tackle with two live lines applies bending force. Later model, used on 382-mi Refugio-Crane (Texas) 10-in. pipelines, has four live lines on tackle. Rig was built by J. C. Davis, welding foreman for Evans and James, Little Rock, Ark., contractors.

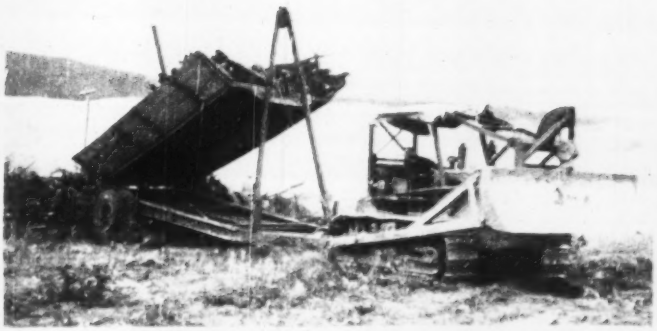
Job-Built Dump-Cart and Rake Used at Hungry Horse

Clearing 55 sq mi of Montana forest for Hungry Horse Reservoir, contractors for the U. S. Bureau of Reclamation have devised some useful tools.

After logging operations are through and brush is burned, the dozer-drawn clean-up cart pictured below carries off trash loaded by hand. The simple dumping device makes unloading easy.

In addition to the reservoir area there are roads to be cleared. The custom-built rake (right) is used with a dragline to remove debris dozed back into standing timber when the right-of-way was cut. It drags brush and stumps out to where they can be removed easily without injury to the trees left standing.

Contractors Wixson, Crowe & J. H. Trisdale, Inc., of Redding, Calif., used the dump wagon. The special rake was fabricated in the shop of the Kalispell branch, Industrial Equipment Co.



CLEAN-UP CART THAT DUMPS is drawn and operated by bulldozer.

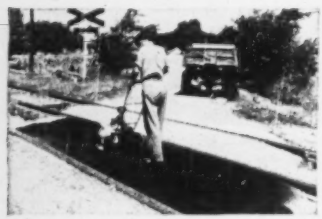
BIG BACK SCRAPER takes up debris in large-scale logging operation.

a 10-TON ROLLER that weighs only 240 lbs.

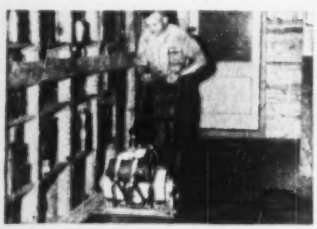
Super-tamps and finishes 45 to 60 sq. ft. per minute to greater density than a 10-ton roller . . .

bituminous or dry concrete pavement patching, mastic or cement-composition floor base, or earth.

Heated plate hits 1900 blows per minute of over 1250 ft. lbs. each. Puts patches in solidly, sealed, cured, ready for immediate use. Works winter or summer.



Works where a roller can't — flush to tracks, curbs, manholes, walls, factory interiors, confined spaces.



Solves maintenance problem on streets, highways and parking areas; paves new drives, walks, floors. One-man operation, transports on material truck, practically no traffic interference.

Earth-tamping — fast and positively uniform tamping of large areas, ditches, flood walls, etc. Machine will not move until material has been solidly tamped.

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READER COMMENT

Weatherman Also Watch

Sir: Under "The Construction Week" of your issue of February 9, you pay appropriate tribute to the Corps of Engineer "Flood Watchers". Your readers would be interested in knowing that flood forecasting history was made in the past flood at the Weather Bureau's flood forecasting centers at Cincinnati and St. Louis, where practically "around the clock" alertness has been maintained since late December. Forecasts were prepared for more than 100 points on the Ohio and Upper Mississippi and their tributaries based on current rainfall and river reports from approximately 350 substations. These reports were collected at 15 river district offices and relayed by FWX to the Cincinnati and St. Louis River Forecast Centers. State and crest forecasts were then prepared and relayed back to the 15 river district offices for dissemination. Forecasts were issued from one to seven days in advance of the occurrence and were the most timely and accurate forecasts ever issued in the Ohio and Upper Mississippi systems. Preliminary reports indicate that several million dollars in property damage was prevented because of these forecasts.

MERRITT BERNARD
Chief Climatological and Hydrologic Services, U. S. Dept. of Commerce

Sunk Dredge Recovered

Sir: The *Engineering News-Record* issue of December 15, 1949, contained the alliterative and euphonious headline "Lake Bids to Dredge Silted Desilter." The article thus distinguished told of bids received by the Bureau of Reclamation for refloating its dredge "The Colorado," which sank near Needles, California, on the night of November 4, 1949, and commented briefly on the type and function of the dredge, the efforts made immediately by the Bureau's field forces to refloat it, and the salvage method expected to be used under contract. Mention was made of the low bid of $238,000 of the Pacific Bridge Co. of San Francisco which covered only refloating of the craft, and the writer of the article attributed to the Bureau (source of information unknown) an estimate of $300,000 additional cost for reconditioning the machinery and equipment that had been submerged.

The dredge (described in ENR Mar. 31, 1949) was refloated February 15, and moored at the wharf at Needles on February 25, where its machinery and equipment are now undergoing rehabilitation. It is expected to be returned to service during the first half of May.

At the time of the sinking the dredge was headed upstream excavating a channel approximately 150 ft wide and 19 ft deep. Operating on a 3-shift, 5-day week, it was anchored and secured for the week end at 9:40 p.m. Friday, November 4. The maintenance crew, arriving at 8:00 o'clock the following morning, discovered the dredge on the bottom of the 19-ft channel. Only the engine room roof and the pilot house were visible above the water.

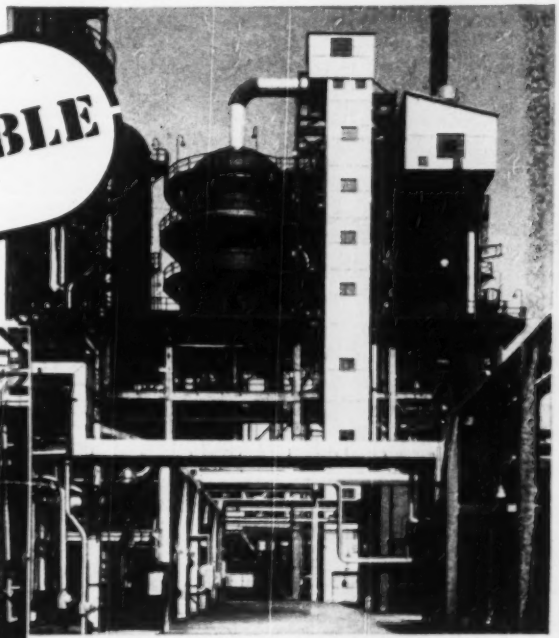
Being caught with your dredge down, so to speak, is not a situation conducive to leisurely contemplation or languorous meditation. An immediate and vigorous attempt was made to refloat "The Colorado." Divers and necessary equipment were moved to the site in record time. The dredge hull is made up of a bolted assembly of steel pontoons with closed positions on the outer rows. The initial action consisted mainly of efforts to close various openings in these outer pontoons so that buoyancy could be restored, at least sufficient to permit pulling the dredge into shallow water. But the Colorado River, in keeping with its character as an unpredictable and capricious stream, suddenly shifted its current burying the hull in sand and silt before the plan of salvage, which promised better than a gambler's chance of success, could be effected.

Comments and observations, both formal and informal, prevailed in proportion to the spread of the news of the sinking. Despite the Bureau's long established policy of contracting its work and its careful study backed up by the recommendations of an independent board of dredging consultants before decision was reached that the nature of the work to be done and the requirements for specially designed equipment dictated performance of the continuing job of river channelization and maintenance by government forces, the Bureau was accused of improper experimentation and bureaucratic invasion of the fields of private enterprise. It had "rushed in where * * *" with the consequence that a "million dollar dredge" was lost and another million or so was about to be spent in a futile effort at recovery. It was even suggested that the dredge be left forever buried in its grave of sand

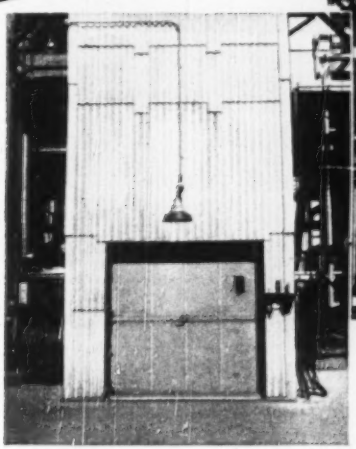
(Continued on page 40)

K&M *"Century"* ASBESTOS CORRUGATED WALLS

NOT PERISHABLE



Mid-Continent Petroleum Corporation Refinery, West Tulsa, Oklahoma.



Elevator Tower and Penthouse protected by K&M "Century" Asbestos Corrugated, applied with "TOP-SIDE"* Fasteners.

Industrial and commercial building walls need a rugged constitution. That's exactly why K&M "Century" Asbestos Corrugated walls are bound to be an economy for you. They provide all the structural strength and staying power of the proved K&M Asbestos-Cement combination. They shed extremes of weather and other atmospheric threats, without even needing paint. They defy fire, rust, rot, rodents and termites. You can plainly add it all up to long-term freedom from maintenance.

Initial savings are just as plain, for K&M "Century" Asbestos Corrugated goes up fast, no special work needed. Fitting is easy with ordinary cutting and drilling tools. Even scaffolds and extra labor can be eliminated by using "TOP-SIDE"* fasteners. They're made so that K&M Corrugated can be anchored to steel members of any type, on sides or roofs. You'll have protective enclosure—and cost figures—that keep on looking good.

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*T.M. U.S. Pat. Off. Enterprise Corp.

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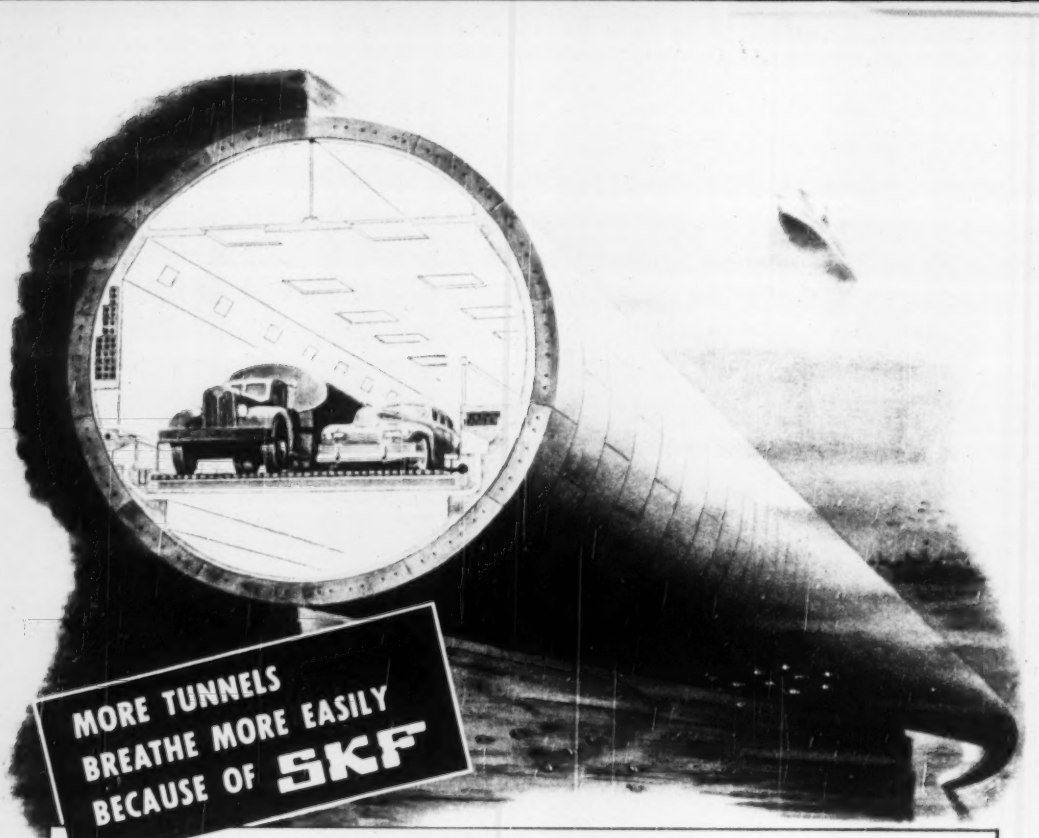
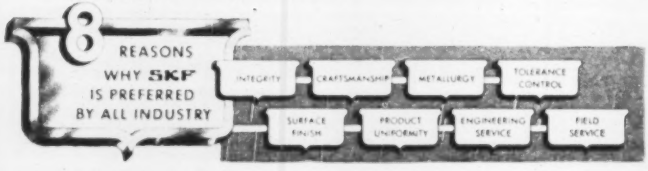


TYPICAL SKF VEHICULAR TUNNEL INSTALLATIONS

Location	Number of Fans	Fan Manufacturer
LINCOLN TUNNEL, New York – South Tube	36	Buffalo Forge Company
LINCOLN TUNNEL, New York – North Tube	20	Westinghouse Electric Corp. – Sturtevant Division
QUEENS MIDTOWN TUNNEL, New York	46	Westinghouse Electric Corp. – Sturtevant Division
GEORGE WASHINGTON BRIDGE APPROACH TUNNEL, New York	8	Buffalo Forge Company
PENNSYLVANIA TURNPIKE – 7 TUNNELS	26	Westinghouse Electric Corp. – Sturtevant Division
BANKHEAD TUNNEL, Mobile, Ala.	3	Clarage Fan Company
BROOKLYN BATTERY TUNNEL, New York	53	Westinghouse Electric Corp. – Sturtevant Division
BROOKLYN BATTERY APPROACH TUNNEL, New York	12	Westinghouse Electric Corp. – Sturtevant Division
WASHBURN TUNNEL, Houston, Texas	5	Westinghouse Electric Corp. – Sturtevant Division

SKF Spherical Roller Bearings have been specified for most of the major tunnel-fan installations because they're self-aligning . . . long-lived . . . require infrequent lubrication and inspection . . . give continuous trouble-free service under highly adverse conditions. SKF Industries, Inc., Philadelphia 32, Pa., the Pioneers of the Deep Groove Ball Bearing, Spherical Roller Bearing, Self-Aligning Ball Bearing. 7071

SKF
BALL AND ROLLER BEARINGS



(Continued from page 46)

and silt, washed over by the cool, caressing currents of the Colorado, as a permanent reminder of what happens to those foolish enough to venture into the realm of the "experts."

It was obvious that raising the dredge after it was silted and sanded in would be a major undertaking. Several contracting firms experienced in salvage operations were invited to view the sunken dredge and meet in Boulder City with Bureau officials to discuss preparation of specifications under which bids would be received covering the work of refloating. These contracting firms were Pacific Bridge Co., Portland, Ore.; Peter Kiewitt Sons Co., Los Angeles; Morrison-Knudson Co., Portland and Los Angeles; and Utah Construction Co., San Francisco. A representative of the firm of Pillsbury and Martignoni, well-known salvage experts of San Francisco was also present. Specifications were issued November 26 and bids received December 7. Only two firms, Pacific Bridge Co. and Peter Kiewitt Sons responded with bids of $238,700 and $247,960 respectively. An engineer's estimate, based on a plan suggested by Mr. Martignoni, was $95,000; a similar estimate by the Office of River Control providing for the use of steel sheet pile cofferdam, was $115,000.

In view of the wide margin between the bids received and the engineer's estimate it was decided to proceed with government forces and equipment under the immediate direction and supervision of the firm of Pillsbury and Martignoni. W. E. Martignoni and W. M. Cathey personally directed operations. The dredge was refloated on February 18, 1950 and moored at the Needles dock about 3 miles distant on February 28. Subsequent investigation indicated that the primary cause of the sinking was entry of water into the No. 4 pontoon through a stuck open check valve on the bilge eductor line.

This is how the job adds up: The cost of refloating by Government forces including fees paid to Pillsbury and Martignoni, whose services were outstanding, was $80,000 or $158,700 less than the lowest of the two bids received for this operation. Transportation back to the Needles wharf was $4,000, and the Bureau estimates $75,000 will be required to completely rehabilitate and put the dredge back into first class operating condition, $225,000 less than the quoted ENR estimate mistakenly attributed to the Bureau.

E. A. Moritz
Regional Director
Bureau of Reclamation
Boulder City, Nevada

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SCOOP
MODEL C

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The versatile Wagnermobile Model "C" Scoop saves time and labor costs with its many efficient uses in the construction field. "Quick-change" attachments mean extra profit on every job. Saves time and labor of bringing in "extra" equipment. Maintenance is minimized.

- Transports, elevates and pours concrete.
- Lifts heavy equipment.
- Lifts and places forms or timbers.
- Shovels, loads and transports dirt or bulk materials.

ATTACHMENTS INCLUDE:
Scoops in 5 sizes—¾ cu. yd. swivel type concrete hopper with 90-degree swing right or left. Lift Fork with 2, 3 or 4 prongs. Special fork with tines for fertilizer or hay. Crane Boom. Track extensions up to total of 26 feet.

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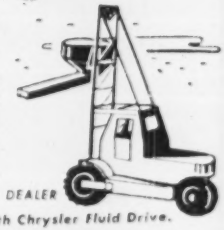

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DEVELOPMENTS ABROAD

SCOTTISH HYDRO DEVELOPMENT—Dunlastair Dam, pictured above, is only one small part of the system of power development being made by the North of Scotland Hydro-Electricity Board, which has the sole right of developing hydro power in Scotland. This little dam checks the Tummel River, allowing 85 cu ft of water per second to pass to keep alive the salmon fisheries for which the stream is famous, but its chief purpose is to divert the bulk of the water into an open aqueduct (extreme left) to supply another hydro station. Scotland's surface waters, it is estimated, offer 6,274,000,000 kwh of potential electricity annually, in addition to the 1,500,000,000 kwh already developed. (Eastern Publishers Service photo.)

Rio Doce project still stumbling

When the Companhia do Vale do Rio Doce was reorganized recently, U. S. engineers in Brazil held their breath. It looked as though the Brazilians again were going to have trouble with the most troublesome development project in Latin America. (ENR Dec. 30, 1948, pp. 954-)

The company, 85 percent owned by the Brazilian government, operates the rich Itabira iron mines in the state of Minas Gerais and the 375-mi single-track, narrow-gage Vitoria-Minas railway which connects the mines with the sea. Ever since 1942, U. S. and Brazilian engineers, backed by three Export-Import Bank loans totalling $26,500,000, have been trying to rebuild the railroad and get Itabira iron ore out to export where it can go into the world market.

• Railroad needed • Some U. S. engineers think less than half of the railroad. Before the war, when the British owned both the mines and the railroad, one train a week struggled over the steep grades and limped home—that is, when torrential seasonal rains didn't block out the road with landslides.

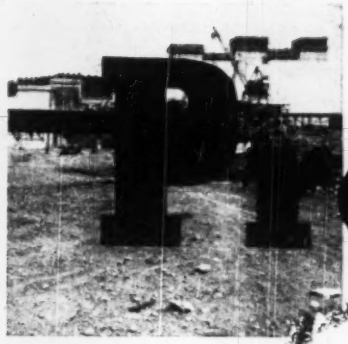
The British turned over their holdings to the Brazilian government during the war in return for a permit to send badly needed iron ore. The U. S. stepped in with loan money and engineering help. But the Brazilians were left to get things done; construction was.

The problems of leveling the grades, taking out some of the worst curves and insuring against landslides were tricky enough. But when the Brazilians chose to staff the company with political cronies of the regime, progress actually came to a standstill. An engineering job that might have taken two years still not complete after eight.

Last month, directors of the Ex-Im Bank went into a huddle over the bank's biggest problem child. What worried the bank's directors most was how they could ever expect to get their money back. The first Ex-Im loan of $7,000,000 was to be repaid in annual installments.

• Can it pay off? Some observers doubt that enough ore will ever pass over the railroad to pay off the debt. A landslide that occurred last spring actually stopped traffic over one section of the road during 1949. A tun-

Continued on page 55



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nel, being driven through the slide, would open the road again in a few weeks. But there are other problems. One permanent obstacle: The rapidly developing river valley is taxing the railroad with farm goods and other traffic that won't move over to let iron ore go through.

Some Brazilians have talked of building a new, standard gage railroad paralled to the present line. This would cost some $175 million—and the U. S. would have to chip in a lot of it.

Washington shows no sign of listening to these suggestions. Under the new organization of the company, there will even be less chance. The new statute gives the company's president wide new powers at the expense of the board of directors. Two Export-Import Bank consulting engineers are on the board.

Robert K. West, Ex-Im Bank's key man on the Rio Doce project right from the beginning, is back in Washington now, reporting to West does not foresee any new troubles under the new company set up. He is optimistic that the railroad will be in full operation soon. He says the road has been tested successfully with a 1,000-ton net load. But it still looks like a long time before Ex-Im Bank will be collecting much in the way of royalties from Itabira iron ore.

TOO MODERNISTIC?—This building, to be occupied by Recursos Hidraulicos, government agency handling irrigation and dam building in Mexico, has caused a controversy. It is situated on Paseo de la Reforma, the city's most famous avenue, and critics say the bright colored tile designs on its exterior will be an eyesore. A fine arts committee is now studying the project, while the Mexican Society for the Promotion of Arts has asked the government to disregard requests that the bright orange, brown and white tiles be removed from the facades of the new 20-story Irrigation Ministry building.

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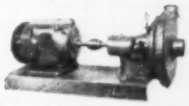

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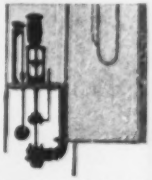

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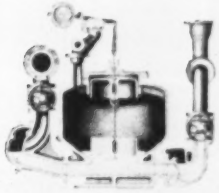

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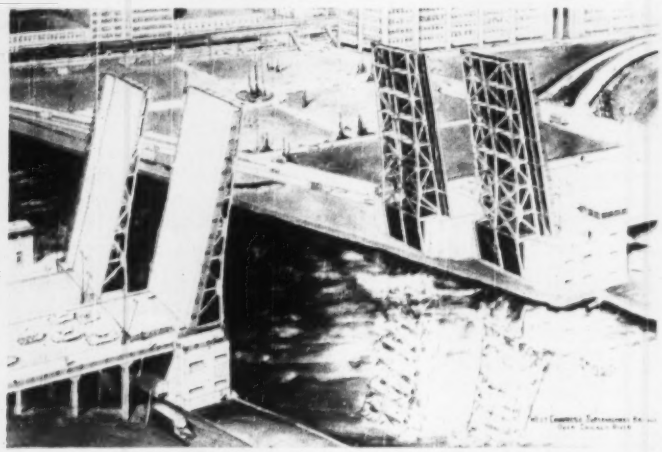


NEW CHICAGO BRIDGE—Engineer's sketch of the first twin, double-leaf bascule bridge over the south branch of the Chicago River for the Congress Street superhighway. Cost is estimated at $3,500,000.

Bridge building plans announced by Chicago

Plans for bridge construction to cost almost $4,000,000 have been announced in Chicago by Stephen J. Michalek, city bridge and viaduct engineer. The projects, to be financed with state motor fuel tax funds, include a twin, double-leaf bascule bridge over the south branch of the Chicago River for the Congress Street superhighway now under construction.

This bridge, to cost about $3,500,000, is designed for two separate 44-ft roadways. The median on the approaches will be built so carriers so that if mechanical trouble develops on one pair of leaves the median can be moved to one side and traffic rerouted to the other pair. Because of the direction of the river the bridge will be offset in alignment.

The substructure will be supported on caissons to bedrock. Its piers will straddle the subway tubes and will carry the reinforced concrete tail portions; these tails will be 37 ft thick to accommodate the huge counterweights. All of the pier work will be done inside of sheet steel cofferdams.

• Other bridge work. Work has just started on the widening from 36 to 76 ft and reconstruction of the present bridge over the north branch of the river at Irving Park Road. It will have two roadways 32 ft wide, separated by a 5-ft median strip and two sidewalks. They will be six lanes of traffic. Kenny Construction Co., Chicago, has the substructure contract at $69,540, and John E. Beasley Construction Co., Chicago, for the superstructure at $192,475.

Work will begin soon on a $1,018,000 Laramie Ave. grade separation under the Chicago, Milwaukee and St. Paul Railway tracks. Thomas McQueen Co. was the low bidder on the substructure at $319,425. The railroad will pay $314,000 toward the cost of the underpass, supporting seven tracks on reinforced concrete box-type abutments with steel spans.

A third new superdeck steel grid roadway and asphalt slab-covered steel sidewalks will be built this summer on the Division bascule bridge over the north branch of the river at Cortland Street. Cost: $172,300.

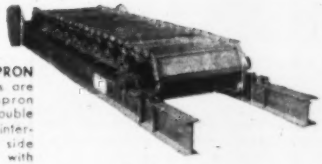
The swing bridge over the Little Calumet River at So. Indiana Ave. will be raised 5.6 ft and redecked to permit sufficient barge clearance and stop traffic interruptions.

Water and sewage news

Latest items of interest in the field of water supply and sewerage include the following:

San Diego, Calif. A $2,500,000 water distribution system bond issue and an increase in water rates have been proposed by O. W. Campbell, city manager, to avert a critical condition in the water department. The increased water rate increase, according to Campbell, is an increase in tax rates to pay the bond interest, which formerly was paid from the department's

Continued on page 56



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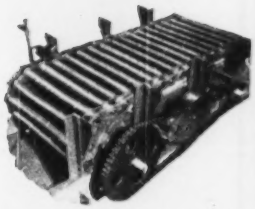

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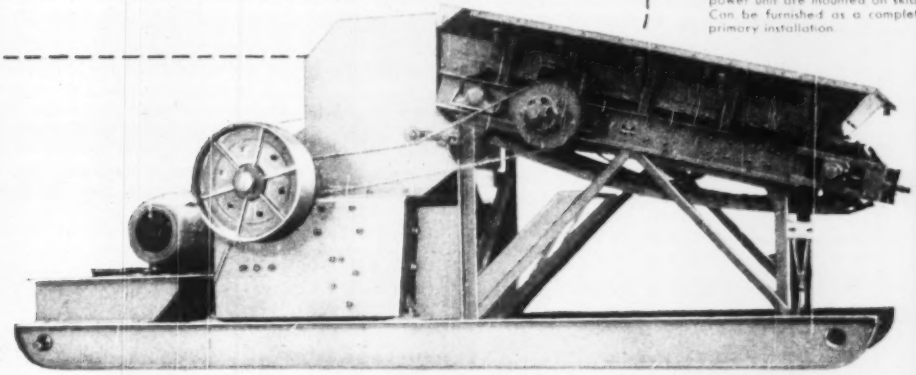

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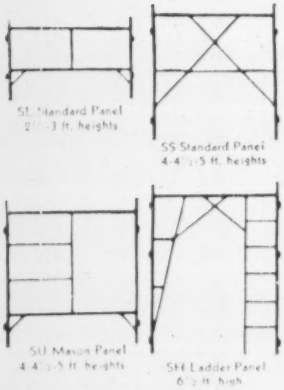

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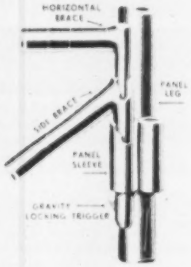
Note in the Diagram how easy and fast an Ezebilt installation can be made. In the simple "Gravity Lock" design, the side braces and horizontal braces are attached to the panel legs . . . no nuts, bolts, or tools required.



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surplus. Revenue declines, however, are expected this year. An approximate 10 percent water rate increase was indicated. Most householders pay 26.6¢ for 100 cu ft of water, which is the highest rate of any large West Coast city. The principal improvements proposed under the bond issue would be $800,000 for cement mortar lining of water lines, $400,000 for a north basin at University Heights reservoir, $400,000 for recreational facilities at reservoirs, and $100,000 for a pumping plant.

Napoleon, Ohio—This city is making plans for a new $1,500,000 sewage disposal plant. It will apply for a $55,600 federal loan for planning, and council has approved an assessment of 40 percent of all water bills to create a sinking fund from which to repay the federal loan.

Dayton, Ohio—A bond issue of not less than $4,500,000 will be required to finance a new water filtration plant, reports City Planning Director Herbert Starack. The city commission is expected to act on the matter soon.

Canton, Ohio—City council recently authorized construction of a $3,600,000 sewage-garbage disposal plant, expected to be ready in two years.

Miami, Fla.—A bill is to be presented to the 1951 session of the Florida legislature to permit one or more cities or counties to set up sanitary districts to handle sewage and garbage disposal and water supply. It is particularly desired to expand the sewage disposal system in Miami.

Illinois—Plans for proposed improvements to public water systems in eight Illinois municipalities have just been approved by the division of sanitary engineering of the State Department of Public Health. The State Sanitary Water Board has granted approval for improvements which will eliminate the discharge of untreated sewage from Freeport into the Pecatonica River. The approved proposed waterworks improvements are at Zeigler, Martinsville, Armour, Tuley Springs, Dieplaines, Danville, Downers Grove, and Evergreen Park.

Covington, Tenn.—A 50¢ minimum monthly sewer charge, as well as a substantial increase in the water rate, has recently been inaugurated here. The new sewer charge is based on the amount of water consumed and is to be added to all water bills. The schedule is as follows: First 3,000 gallons used, $.50; next 3,000 gallons, $.40; next 3,000 gallons, $.35; next 3,000 gallons, $.25; and all in excess of 25,000 gallons, $.20 per 1,000. The new water rate calls for a minimum charge of $1.20 the same as previously but the minimum amount has been reduced from 4,000 to 2,000 gal.

MEN AND JOBS

George W. Roundtree has joined the Gaston County Health Department at Gastonia, N. C., as senior sanitary engineer. A graduate of the University of Southern California, he served during the war as officer in charge of malaria and mosquito control with Gen. Douglas MacArthur's General Headquarters Staff in New Guinea and with the Air Corps in the China Burma India Theater. Since leaving the service, he has served as senior sanitarian with a city county health unit at Colorado Springs, Colo., and with the North Carolina State Board of Health, and recently completed requirements for a master's degree from the University of North Carolina School of Public Health.

H. R. Jensen has been named flood control engineer for Harris County, Tex., to succeed **R. J. Putney** who will open his own engineering office in Houston. Jensen formerly was with the district Army Engineer's office at Galveston.

Lieut. Col. Herbert C. Gee, assigned as assistant chief of civil works in charge of the nationwide flood control program, has announced his resignation from the Army. He will soon

(Continued on page 59)

A. L. Saunders, left, resident engineer for Corps of Engineers, Del E. Webb, center, company president, and J. N. McPhee, Del E. Webb Construction Co. job superintendent, inspect progress of $4,000,000 Veterans Administration hospital under construction at Phoenix, Ariz. Work, slowed by steel strike delays, now is advancing rapidly.

While attending Purdue's Industrial Waste Conference, R. E. Horton, sanitary engineer with the Ohio River Valley Water Sanitation Commission, L. E. Kinnaman, research engineer at Purdue, Ralph Holtje, chief of stream pollution section, and L. V. Emelity, asst. sanitary engineer, both of the Indiana State Board of Health, left to right, get together to check the report on the Wabash River pollution survey.

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establish his own office as a consulting engineer in West Palm Beach, Fla. Colonel Gee was in the flood-control program since October, 1947. He is a graduate of the University of Iowa, 1930; the U. S. Military Academy, 1935; and received his master's degree in civil engineering at the University of California in 1938.

Winston Bros. Co. has changed its address to 1532 South California Ave., Monrovia, Calif.

G. B. Watson, for 26 years Arcadia, Calif., city engineer, retired March 21.

Robert W. Sweet, who for the last 25 years has been associated with the engineering department of the New York State Department of Public Works, has been promoted to associate civil engineer in the Rochester office. He has been made engineer of location and design.

S. C. Austin of Raleigh, N. C., equipment engineer for the North Carolina State Highway Commission, with which he has been connected for 29 years, has resigned to become assistant executive secretary of the Carolinas Branch of Associated General Contractors, at Raleigh. He will help member contractors prepare their plans and specifications, size up highway projects and provide other technical information. **Robert Patten** of Charlotte, N. C., will continue as executive secretary, with headquarters at Charlotte. Austin obtained his civil engineering degree from the University of North Carolina in 1921 and immediately joined the N. C. Highway Commission as a resident engineer. Later, he was promoted to district engineer and to 10th Division engineer, to equipment engineer in July, 1941.

John E. Flaherty, civil engineer in the Boston, Mass., Public Works Department, has been promoted to engineering assistant to Commissioner George G. Heland. He will prepare reports and conduct engineering investigations.

Henry C. Tammen has become partner in Howard, Needles, Tammen & Bergendoff, consulting engineers, of Kansas City, Mo., and New York City. Admitted as partners are **Theodore L. Cambern, James P. Exum, Josef Sorkin, Ellis E. Paul,** and **Elmer K. Timby.**

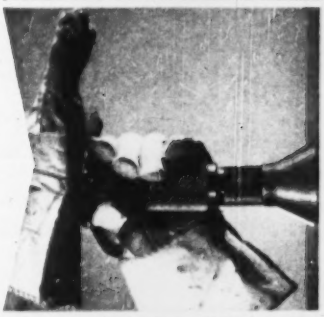
L. H. Reed, a consulting engineer from Pittsfield, Mass., has been named Zanesville, Ohio, city engineer, succeeding the late Carl Spencer.

READY!

Takes less than 30 seconds to prepare RAMSET TOOL with power charge and choice of 65 coated steel fasteners.

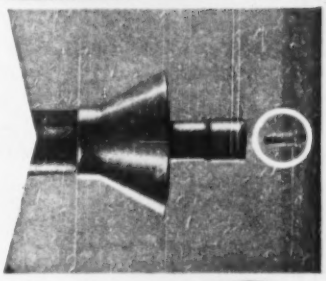
RAM!

Place light, compact tool against work, locating fastening point as accurately as desired. Then tap lightly and the fastener is . . .



SET!

Instantly, tightly, cleanly, easily. No drilling, chipping or plugging. Less than a minute from start to finish.



FAST . . . RELIABLE *RAMSET SYSTEM* SLASHES COSTS . . . AND TIME . . . FOR FASTENING INTO STEEL AND CONCRETE

Every day, thousands of users are making startling economies in money and time with RAMSET FASTENING SYSTEM. For practically any kind of fastening jobs into steel, concrete, masonry, RAMSET does the work faster, better, cheaper.

Let us show you, by comparison with ordinary methods, how you can cut costs up to 60% and do your fastening work in ¼ the time with the modern, reliable, proved RAMSET SYSTEM. Send for details and address of nearest RAMSET Specialist.

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12117 Berea Road • Cleveland 11, Ohio
PIONEER IN POWDER-ACTUATED FASTENING

Tuffy

TRADE MARK ®

SLINGS

Entirely Unlike Any Other

Scores of wires, stranded into 9 parts, then machine woven into an interlaced wire fabric—that is the unique patented construction which gives Tuffy extraordinary flexibility and stamina.

Super TOUGH—On every kind of load, under all kinds of pulls and with every type of hitch, Tuffy Slings have proved their superiority and universal adaptability.

Super-FLEXIBLE—Tie Tuffy Slings into knots, kink them, flatten the eyes. Observe how many more times you can straighten Tuffy Slings out without material damage. Note too, that cutting any one of the 9 parts will not result in stranding the sling.

Tested Strength Twice Safe Working Load Limit

Each Tuffy sling is proof-tested to twice the safe working load indicated on its metal tag. Tuffy's interlaced construction makes possible eye splices averaging 95% of fabric strength.

9 Types—Factory Fitted Or Unspliced on The Reel

Try any one of the 9 factory packaged types — for choker, basket or bridle hitches. Prove to your own satisfaction their money saving worth to you. Or, if you're rigged for splicing—Tuffy interlaced wire sling fabric is available on the reel.

union *Wire Rope* CORPORATION

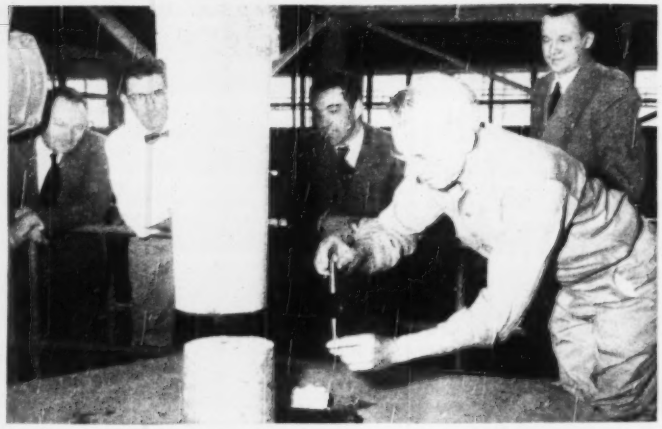
2228 Manchester Ave.,
Kansas City, Mo.
Send Tuffy Sling details.

FIRM NAME_____

ADDRESS_____

CITY_____ STATE_____

EDUCATION and RESEARCH



POWERFUL TESTER—This testing machine capable of exerting 5,000,000 lb. in tension was itself tested recently prior to acceptance at the Denver laboratories of the Bureau of Reclamation. It will pay for its high cost by disclosing weakness or excessive strength of bureau-designed shapes or materials considered for projects. Shown is an eight-inch steel bar which failed at 4,175,000 lb. load. Leaning against the lower crosshead of the machine, James McCord of the Baldwin Locomotive Works, the manufacturer, compares the 8.2-in. bar with a standard .505-in. bar broken by a small testing machine. Looking on, from left to right, are M. L. Hall and E. S. Buckingham of Baldwin, and Frank Tessitor and Walter Price of Reclamation.

Additional agreements for housing research

More agreements upon projects in the research program authorized under the Housing Act of 1949 have been announced. These investigations, to be made by Pennsylvania State College and the U. S. Department of Agriculture, will supply needed data on determination of water-vapor permeance of walls and from electrolytic metal and fungi caused by soil moisture in the crawl space of a house with no floor.

The construction of more tightly built houses through the use of new materials and of the fuel-conserving home is making the development of new, or at least more knowledge on, moisture condition in dwellings. Establishment of reliable information on moisture conditions will enable the designer or builder to prevent damage and deterioration from excessive condensation in roofs, walls and floors.

Another project covers ascertaining into which temperature and relative humidity ranges found in different types of small dwellings with gravity furnaces or the living habits of the occupants. Data will be gathered on not less than 15 dwellings.

In the two projects to be handled by Pennsylvania State College, data will be gathered on water-vapor accumulation within wood-frame walls exposed to actual weather conditions and to temperature and humidity conditions considered realistic for the living habits of people. The first project will provide data on water-vapor characteristics under controlled interior conditions of temperature and humidity and actual weather on the exterior.

Projects covering investigations in plumbing and sewage disposal systems, heating and ventilation, and chimneys and flues have been announced previously. The latter projects will be handled by the National Bureau of Standards, the U. S. Public Health Service and the University of Illinois.

Investigations are set up under the supervision of Richard F. Ratcliff, director, Division of Housing Research, and are to be carried out through the existing facilities of other agencies under the sponsorship of HHFA.

Glennan tells of defects in engineering education

Defects in engineering education were pointed out to members of the Niagara Gorge Chapter of the New York State Society of Professional Engineers recently by T. Keith Glennan, president of Case Institute of Tech-

(Continued on page 65)

Barber-Greene Photo-News

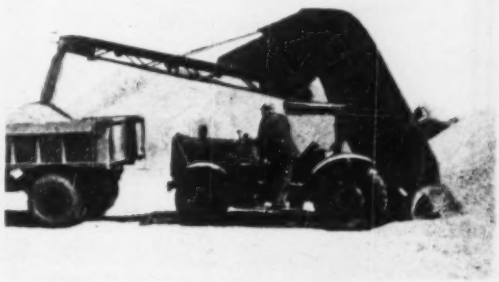
ON-THE-JOB VIEWS AND COST-SAVING IDEAS • VOLUME 1 • NO. 1

Extensive use of cost-reducing belt conveyors is evident in this view of Uvalde Rock Asphalt Company's plant.

MINES 6 MILES OF ROAD PER DAY

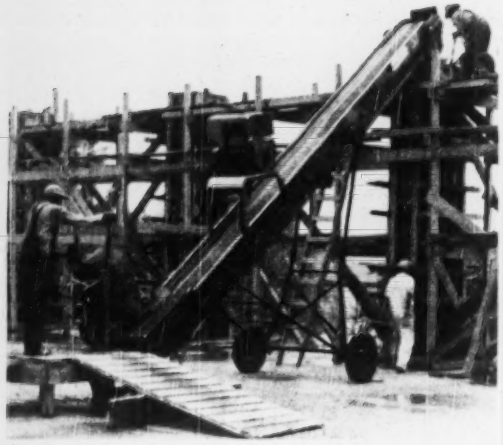
Every day from 3,000 to 4,000 tons of processed rock asphalt are produced by the Uvalde Rock Asphalt Company out in Blewett, Texas — enough to put a 1-inch top course on 6 to 7 miles of road. This impressive production achievement is made possible largely through the use of belt conveyors that handle all the material through processing operations to the various stock piles. B-G Belt Conveyors are ideally suited to this type of operation, where relocation is frequently necessary. They are easily disassembled, relocated and reassembled as conditions dictate.

HISTORICAL SITE FOR TURNPIKE PLANT. A modern B-G belt conveyor system identifies Pennsylvania Aggregate's Cornwall plant which is located on famed Cornwall Banks — site of one of the world's greatest mines — oldest continuously operated in the new world. The two-century accumulation of limestone — eight million cubic yards — is being processed for use by various Turnpike contractors.



NEW LOADER HAS LONG REACH. Longest, highest trucks, trailers — even railroad cars — are loaded to full capacity at a 3 yd. min. clip by the B-G 543 Loader. Hydraulically controlled conveyor swivels to trim load, eliminates spillage or partly filled trucks. The 543 travels at 15 m.p.h. on its tractor-type chassis is easily convertible to a 7-11 yd. min. snow loader to give year 'round service.

Barber-Greene *Photo-News*



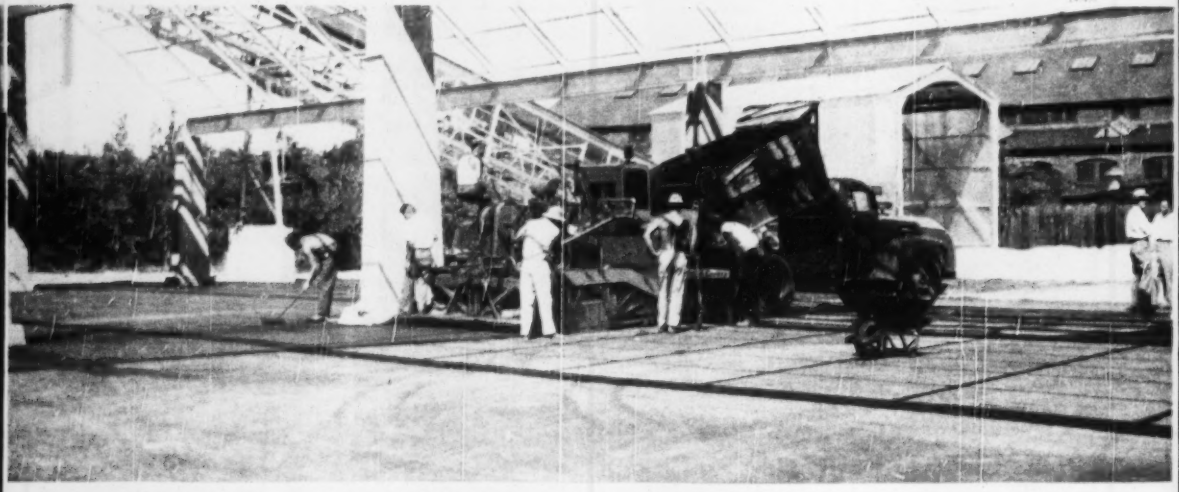
WET CONCRETE GETS A LIFT. Another example of the broad variety of work that can be done by B-G portable conveyors came up on a recent H. A. Dailey Company job near St. Louis. A number of 16-foot columns were poured by Dailey's B-G portable — eliminating costly ramps and scaffolding, allowing simple buggy loading. The job was done quickly at lowest cost by this portable Barber-Greene which, incidentally, was towed all the way from Aurora, Illinois, to the job, over 250 miles. Portability like this pays off on job after job.

"AT HOME" IN MIAMI SUBDIVISION. Digging footings by hand in tough coral rock is an expensive operation that's avoided by such Florida contractors as the Clinton Construction Company in Miami. On a large subdivision project recently, all footings were dug by their B-G ditcher on an "efficient and economical" basis. Coral rock, caliche, frozen ground — even bituminous pavement — pose no problem for B-G Vertical Boom ditchers. Their "milling action" enables them to cut through toughest material, leaving a clean-bottomed, smooth wall trench.

INSIDE JOB

By a Smooth Operator

When the state of New Hampshire decided to improve the footing and reduce adulteration by surfacing the floor in its Concord coaling base shed, a B-G finisher owned by The Manchester Sand and Gravel Company took over the job. In the shed area, which was restricted by several rows of I-beam roof supports, it maneuvered smoothly to place 500 tons of material with a minimum of hand work required for finishing. The base and binder course were laid the length of the building, and the final sheet asphalt course was laid at right angles to them. Result: a smooth, weatherproof surface at lowest cost.

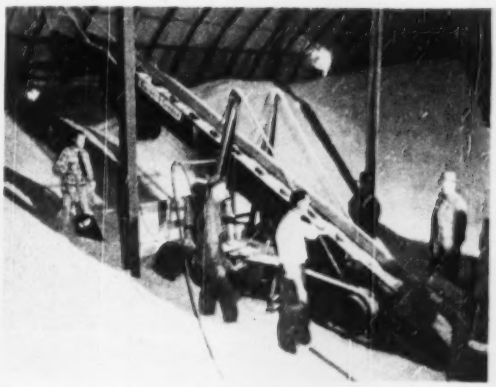


for full, fast information on any equipment

A NINE-YEAR-OLD MAKES GOOD IN NEW CAREER

Back in 1941 a B-G Travel Plant mixer started its working life with Rein and Schultze, Wisconsin road builders. Today, nine years and many hundreds of miles later, this original Travel Plant forms the nucleus around which the owners have built a highly efficient single aggregate plant. With a B-G Dust Collector and low pressure burner Dryer, this setup produced 120 tons of mix per hour in recent work on Wisconsin Highway 71. Future plans involve the possibility of adding a gradation unit for producing multiple aggregate hot mix. Barber-Greene long-term sturdiness combines with Barber-Greene flexibility to greatly extend and prolong the usefulness of B-G asphalt mixing equipment.

REMIND YOU OF LAST WINTER? Communities where snow took its toll last winter — in lost parking meter revenue, traffic and business interruptions and the like — should plan now to be ready next year to minimize these losses and to cut the cost of clearing snow quickly. The new Barber-Greene Model 544 is within the budget of small communities. It travels at 15 miles per hour — and loads up to 11 cubic yards a minute, keeps trucks on the move with a minimum of manpower. An added asset: it can be converted to an all-material 3 yard-per-minute truck loader for summer use at little cost other than for exchanging the bucket lines. Other B-G Snow Loaders with capacities to 20 cu. yd. min.



NEW TWIST FOR A "GOOSENECK." The versatility of a B-G Gooseneck Loader eliminated the need for extra investment in machinery for the Farmers Elevator Co. of Mason City, Ia. For with the problem of cutting costs in loading, unloading and reclaiming coal, they needed mechanical help in storing over 55,000 bushels of corn. Their B-G "Gooseneck," along with its coal business duties, handled this job — loading storage bins at a rate of 300 bushels in 20 minutes. The exclusive Gooseneck design of this Barber-Greene — which minimizes degradation when handling coal — was an asset in handling seed corn as it helped prevent damage to the kernels.

on these pages -- see your B-G Distributor

Barber-Greene *Photo-News*

IT'S A BRIDGE— FOR AGGREGATE ONLY

When your sand deposit is on one side of a navigable stream and your plant and railroad facilities are on the other, you have a problem similar to that one faced by Becker County Sand and Gravel Company in Fayetteville, North Carolina. Their solution: a unique bridge with 55-foot clearance carrying a 408-foot B-G belt conveyor, and another B-G conveyor that takes the sand and gravel to the washing and screening plant. Currently, this company is moving around 25 cars per day from this plant—another "special" problem solved through the use of standard, pre-engineered, easy-to-install Barber-Greene belt conveyors.

TRIPLE PLAY BY WELL-KNOWN TEAM. From siding to silos via B-G hopper-car unloader and B-G transfer and shuttle belt conveyors is a fast, low-cost trip for materials used by Imperial Redi-Mix Company at their plant at Melrose Park, Illinois. Mechanized "push button" handling with this unloading-storing team reduces the manpower requirements to a minimum.

SERVICES THAT PAY — MORE THAN THEY COST

There is much for you to gain in calling upon your Barber-Greene distributor for help in solving problems involving the handling of all materials . . . mixing and placing bituminous surfacing materials . . . as well as ditching and snow removal. Your B-G distributor and his sales and service representatives have been through intensive training courses at the Barber-Greene factory. They know how to apply Barber-Greene equipment to assure the most in performance on your job—they know how to show you the best in maintenance practice. Further, your B-G distributor has service and repair part facilities you can depend upon through the years. *For complete information—bulletins, specifications and prices on any or all Barber-Greene equipment—get in touch with your B-G distributor or call, write or wire directly to the address below.*

Barber-Greene Company
AURORA, ILLINOIS, U. S. A.

nology, Cleveland, Ohio.

"In the past," he said, "certain deficiencies have shown up in engineering education since many young engineers lacked understanding of human problems, and the ability to speak and write well. They also seemed wanting in connections about, and knowledge of, our democratic processes, and an understanding of business problems."

However, he said that these conditions are being corrected in modern engineering schools.

"Industry expects," he said, "that its engineers will have ability for leadership, orderly thinking, knowledge of technical subjects, and the ability to apply it in a humanitarian manner."

Faculty News

Horace S. Ford, treasurer, and Edward L. Moreland, executive vice president of the Massachusetts Institute of Technology, will retire next July. Mr. Ford has been principal financial officer of the institute for the last 36 years. Dr. Moreland was dean of engineering from 1938 to 1949.

The appointment of Prof. John I. Rule, head of the section of graphics at the Massachusetts Institute of Technology since 1938, to be chairman of the general science and general engineering courses, was announced recently by President James R. Killian, Jr. Professor Rule will succeed Prof. Ralph G. Hudson, who has been in charge of the courses since 1952, and will become emeritus in June.

Harold E. Babbitt, professor of sanitary engineering, University of Illinois, has been granted leave of absence for this semester to study recent trends in sanitary engineering, largely through visits to research laboratories and with state sanitary engineers.

Russell C. Brinker, associate professor of civil engineering at the University of Southern California, has been appointed professor of civil engineering at Virginia Polytechnic Institute, effective Sept. 1, at the same time that Prof. P. H. McGauhey assumes the headship of the civil engineering department, succeeding R. B. H. Begg, retiring after 37 years. Brinker earned his master's degree in civil engineering at the University of Minnesota in 1933, and has done additional graduate study at Worcester Polytechnic Institute and Columbia University.

Lorenz G. Straub, director of the St. Anthony Falls Hydraulic Laboratory at the University of Minnesota, and head of the department of civil engineering, is civilian member of the Beach Erosion Board of the Corps of Engineers.

ELECTIONS AND ACTIVITIES

The Boston, Mass., Society of Civil Engineers has elected the following officers: President, Thomas R. Camp, Camp, Dresser & McKee; vice president, Emil A. Gramstorff, professor and head of the department of civil engineering, Northeastern University; secretary, Robert W. Moir, associate civil engineer, Metropolitan District Commission; treasurer, Herman G. Dresser, Camp, Dresser & McKee; directors, William E. Hyland, Ley, Spofford & Thorndike; Allen J. Burdoin, senior engineer, Metcalf & Eddy, engineers.

At a recent meeting of the Arkansas Society of Professional Engineers registration certificates were presented to Delbert A. Schmand, Wm. B. Stiles, Wm. A. Lewis, Jr., R. D. Lines, Henry E. Stratton, W. C. Van Meter, M. E. Barker, Frank D. Conlee, Henry C. Wilms, E. M. Methvin, C. O. Cogburn, Thos. B. Fleeman, Jr., and Maurice F. McCoy, from various sections of the state.

MAJOR MEETINGS

Producers' Council. Meeting. Washington, D. C. May 9-10.

Highway Conference. Kansas City, Mo. May 15-17.

U. S. Conference of Mayors. Washington, D. C. May 15-17.

Florida Highway Conference. University of Florida, Gainesville, Fla. May 15-17.

American Water Works Association. Annual Meeting. Washington, D. C. May 15-19.

National Citizens Conference on Planning. Annual Meeting. Washington, D. C. May 16-17.

American Water Work Association. Pacific Northwest Section. Annual Meeting. Vancouver, B. C. May 17-19.

Society for Experimental Stress Analysis. Annual Meeting. Pasadena, Calif. May 17-19.

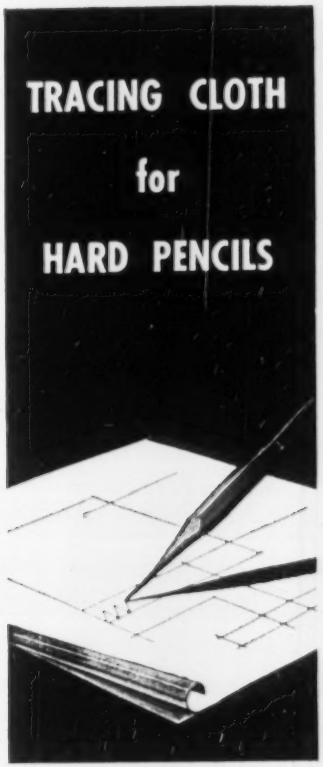
Building Officials Conference of America. Annual Meeting. Detroit, Mich. May 21-25.

Central States Sewage Works Association. Annual Meeting. Dubuque, Iowa. May 22-23.

Western Association of State Highway Officials. Annual Meeting. Boise, Idaho. May 22-24.

Pennsylvania Sewage Works School. Annual Meeting. Pennsylvania State College, State College, Pa. May 22-24.

Pennsylvania Water Works School. Annual Meeting. Pennsylvania State College, State College, Pa. May 22-24.



● Imperial Pencil Tracing Cloth has the same superbly uniform cloth foundation and transparency as the world famous Imperial Tracing Cloth. But it is distinguished by its special dull drawing surface, on which hard pencils can be used, giving clean, sharp, opaque, non-smudging lines.

Erasures are made easily, without damage. It gives sharp, contrasting prints of the finest lines. It resists the effects of time and wear, and does not become brittle or opaque.

Imperial Pencil Tracing Cloth is right for ink drawings as well.

IMPERIAL PENCIL TRACING CLOTH

SOLD BY LEADING STATIONERY AND DRAWING MATERIAL DEALERS EVERYWHERE

Our truck dispatcher was getting over $20,000 a year—but we didn't know it!

(Based on Hartford Claim #127763)

We operate a cartage service, making pickups and deliveries for companies that don't have their own trucks. Often our drivers collect C.O.D.'s, and they turn in the money to our dispatcher who sets up the accounts on it for our cashier. We had a very capable man in this dispatching job whom we were paying about $4500 yearly. But that wasn't enough for him and his taste for gambling and high life. He began to hold back some of the C.O.D. collections and juggle the accounts. In less than a year, before the shortages became so great he couldn't conceal them any longer, he got away with $16,000! Fortunately we had a $10,000 Fidelity Bond with the Hartford which we collected in full to partially make up our loss. This experience proved to us that *all* employees should be bonded *and for an adequate amount!*.

• • •

What about *your* exposure to dishonesty losses—is your business completely and adequately safeguarded against this risk? Hartford Blanket Fidelity Bonds offer the protection you need in the most modern, efficient and economical form. Your local Hartford agent or your own insurance broker can provide full details about this "Dishonesty Insurance" without obligation. Call Western Union "Operator 25" for the name and address of the Hartford representative in your community, or write to the company for a free explanatory booklet.

HARTFORD

ACCIDENT AND INDEMNITY COMPANY

Hartford 15, Connecticut

Hartford Fire Insurance Company

Hartford Live Stock Insurance Company

YEAR IN AND YEAR OUT YOU'LL DO WELL WITH THE HARTFORD

OBITUARY

Walter Scott Walls, 77, engineer in the Western New York area for many years, died April 18. He began his career with the Buffalo engineering firm of Ricker and Wing. Later he worked at the Union Bridge Works in Athens, Pa., for the George L. Morrison Co. in Chicago, and the Pittsburgh Testing Laboratory. He was superintendent of construction when the Lackawanna Steel Co. went to Buffalo. He later had charge of construction projects for the Ontario Power Co. at Niagara Falls, Ont., and designed and directed construction of the high-level bridge at St. Catharines, Ont.

Joseph D. Roberts, a structural engineer and chief engineer of the Central Illinois Public Service Co., died at Springfield, Ill., April 15.

Edwin O. Myers, 73, founder of the E. O. Myers Construction Co., Mansfield, Ohio, died April 18. He was chief adviser to the Bureau of Roads of Michigan for ten years before he went to Ohio in 1950.

Howard O. Core, 78, former Delaware County engineer at Delaware, Ohio, and on the county engineer's staff for more than 20 years, died April 15.

Fred A. Mitchell, 54, chief engineer for the Milwaukee Bridge Co., Milwaukee, Wis., died April 5.

George Bryson, 68, former town engineer of Brockville, Ont., and from 1932 to 1947 street supervisor of Ottawa, died April 17. He was one of the founders of the Professional Engineers Association of Ontario.

•

Garage ordinance—A war-suspended Los Angeles building law requiring construction of a garage for every new single or double family residence may not be reinstated for another five years, under a proposal advanced by a city councilman, who claims that enforcement of the garage ordinance now would work a financial hardship on 2,500 families whose homes are without garages and who would have to spend an average of $600 to build them. New construction would not be affected by the moratorium. Building permits issued now require the construction of a garage, but final inspection approval may be obtained with only a garage foundation and floor, provided the garage is completed within a year.

LOST: 19 FEET OF WATER IN THE HEART OF TEXAS

Belton Dam at Mill
Lookin

Photo courtesy Corps of Engrs., Galveston, Texas District

You're looking at BELTON DAM TEST PIT #2 — Belton, Texas — where a MORETRENCH WELLPOINT SYSTEM operated so effectively that water was lowered to within 1 foot of the rock found at subgrade. Sandbagging took care of the rest. Test hole explorations went ahead "in the dry."

This was a difficult job because of adverse soil conditions. The contractor, Russ Mitchell, Inc., Houston, Texas, knew from past experience that he could count on MORETRENCH to handle the pumping perfectly.

Confidence like this is earned . . . a good thing to remember when you're in the market for wellpoints!

CATALOG ON REQUEST

MORETRENCH CORPORATION

90 West St.
New York 6

4900 S. Austin Ave.
Chicago 38, Illinois

7701 Interbay Blvd.
Tampa 9, Florida

315 W. 25th St.
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Rockaway
New Jersey

PAYING FOR THINGS IS SO

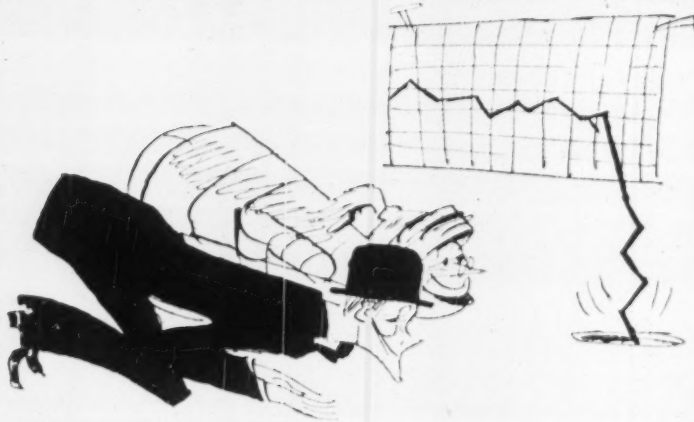
(a sympathetic ad)

1

Because businessmen like protection...

2

But hate paying for it...



5

50% below the average rate in some cases!

AMERICAN MUTUAL ...the first American liability insurance company

© 1961 AMERICAN MUTUAL LIABILITY INSURANCE COMPANY

ANNOYING! BY MR. FRIENDLY

(3) We've helped 'em eliminate accident hazards . . .

(4) Which cut their insurance costs as much as . . .

Look at these savings and look us up!

Here are a few of many cases where we've helped companies to reduce premiums to below average for their field!

A KANSAS IRON WORKS *From 24.5% above average to 14.0% below, in 4 years.*

A MASSACHUSETTS MFR *From 26.2% above to 6.9% below in 1 year.*

AN ALABAMA CONTRACTOR *From 24.3% above to 6.8% below in 1 year.*

We saved a large Iron works almost half a million dollars through dividends alone in 20 years. And another company over $400,000.00 in 27 years. If you're interested in savings, that's our middle name!

MAIL THIS COUPON NOW—WITHOUT DELAY!

Dept. 6-6, American Mutual Liability Insurance Company
142 Berkeley Street, Boston 16, Massachusetts

Without obligation, please write me information on *The All American Plan* so that I may be richer and happier!

Name _____

Street _____

City _____ State _____

MATERIALS AND LABOR PRICES

Market quotations on construction materials and wage rates reported monthly by ENR correspondents
June Materials and Labor Prices will appear in the June 8, 1950 issue

CEMENT, AGGREGATE, READY-MIXED CONCRETE—F. O. B. CITY

	PORTLAND CEMENT*			SAND AND GRAVEL			CRUSHED STONE		CRUSHED SLAG	CONCRETE BLOCK	CONCRETE
	Per bbl. C.L. lots incl $1.00 per bbl. for bags; cash dis. not deducted			Per ton, carload lots			Per ton, carload lots		Per ton, carload lots, f.o.b. plant	8 x 8 x 16-in. truckload del. per block	Ready-Mixed 1:2:4, over 50 c.y., del.
	Cloth	Paper	Bulk	Gravel, 1½ in.	Gravel, ¾ in.	Sand	1½ in.	¾ in.	1½ in.	Sand gravel	LS, wet aggr.
Atlanta	$4.16	$3.41	$3.16	$2.00	$2.00	$1.75	$2.10	$2.10	$1.65	$1.85	$0.1725	$0.1725	$11.00
Baltimore		3.39	3.14	2.40‡a	2.40‡a	1.95‡a	2.40‡a	2.70‡a	2.45‡a	2.45‡a	16	16a	10.25
Birmingham	3.75	3.00	2.68	2.00	2.00	1.84	2.50	2.50	1.00	1.20	145	145	7.75
Boston		3.67	3.41	2.50‡	2.50‡	2.30‡	1.60‡	1.70‡			196	205a	10.45‡
Chicago	3.85, 3.60	3.02, 2.90	2.68, 2.74	2.75‡‡	2.75‡‡	2.25‡‡	2.75‡‡	2.75‡‡	2.00‡‡	2.00‡‡	20	206	9.70
Cincinnati	4.14	3.74	3.08	1.75‡	1.75‡	1.85‡	2.00‡‡	2.00‡‡	1.50	1.50	185	205	11.65‡
Cleveland	3.85	3.60	2.75	1.90‡	1.65‡	1.55‡	1.55‡a	1.55‡a	2.70‡	2.70‡		21	11.80‡
Dallas	3.54	2.74	2.49	2.00	2.15	1.75	2.10	2.15			180a	125	9.30
Denver		3.34	3.29	1.85	2.00	1.75					20	23a	9.65
Detroit		2.98	2.73	3.25‡b	3.25‡b	3.00‡b	2.75‡	3.10‡	2.75‡	3.00‡	3.00‡	17	18a	9.85
Kansas City	3.93	3.73	2.88	1.90	1.90	1.50‡	1.90‡	1.90‡			17ag	215e	10.30‡
Los Angeles		3.72‡a	3.22‡a	1.945‡a	2.045‡a	1.745‡a	1.925‡a	1.925‡a			125	227	9.70‡‡
Minneapolis	4.13‡d**	3.53‡d	3.07‡d	2.30‡ag	2.35‡ag	1.85‡ag	2.40‡ag	2.40‡ag			21a		10.50‡‡
Montreal		2.49‡‡e	2.31‡e		2.50‡‡	2.00‡‡	80‡‡	1.10‡‡			22	20a	9.05‡‡
New Orleans		2.98‡e	2.65‡	2.32	2.32	1.82			1.05	1.25	25		12.40
New York	4.29	3.49	3.24	2.10‡‡	2.10‡‡	1.45‡‡	2.35‡‡	2.35‡‡					10.50‡‡
Philadelphia	3.90, 4.21‡	3.13, 3.41‡	2.87, 3.17‡	2.45‡	2.55‡	2.05‡	1.90‡	1.95‡	1.50	1.50	18, 22		10.80
Pittsburgh	3.90	3.18	2.85	2.05‡	2.05‡	2.05‡	2.30‡	2.30‡	2.05	2.05	214	214	10.85
St. Louis		2.90, 3.05‡	2.77‡	2.40‡	2.60‡cm	2.40‡cm	2.00‡	2.40‡cm	1.60	1.60	1.15	1.15	215	24a	9.40
San Francisco		3.39	2.99	1.80	1.80	1.90	1.80‡						22e		10.15‡
Seattle		3.55‡	3.10‡	2.75‡m	2.75‡m	2.75‡m	3.50‡m	3.50‡m			225	233‡	10.25‡

‡ Discounted. * Prices not shown include sales tax where listed. ** CLARIN: a Sidg. to 10¢ dis. b Less 2% for cash. c C.L. price dealers' commission. d Dealer distributor. e Less 2% cash discount. ‡‡ Subject to discontinuance after Jan. 1. SAND, GRAVEL, STONE & SLAG: a Truck lots. b Per ton of 2,000 lb. c Shot or run of crusher. d Less 2% cash. e Less than 3 tons. f Sales tax incl. g Bulk, quarry. h Barge lots. i Delivered Hudson River. m Less 2% for cash.

CONCRETE BLOCK: a Cinder. b Waste. c Haydite. d Celocrete. e 3.5 x 8 x 12-in. f 4 x 8 x 16. g Incl. truck at job. h Less 2% for cash. i Less 1% for cash.

READY-MIXED CONCRETE: a 5 cu. yds. or over del. Man. b 25 cu. yds. or more. c 10-100 cu. brackets. d Truck loads up to 700 cu. yds. e 2,000 lb. mixer. f 2,500 lb. comp. g Aver. haul 7.9 mi. zone. h Less 5¢/c for cash. i 5% off for cash. j 2% off for cash. k Sales tax included. l 1:2:3.

CASH DISCOUNTS—CEMENT: Contractors: Truck delivery 2% for cash on bill of month; or earnest deliveries, no trucking, same as dealer cash discount 10¢ per bbl. for payment within 15 days of date of invoice. Subject discount 10¢ per bbl. 20 days in Montreal.

CURRENT MAXIMUM PRICES AT CEMENT MILLS

Charge for bags not included. For cloth bags, add $1.05 per bbl. 2¢ a bbl. allowed for each returnable bag; for paper bags add 25¢ per bbl., not refundable.

	Bulk		Bulk
Richard City, Tenn.	$2.40†	Bellingham, Ind.	$2.40
Chinchilla, Ga.	2.40†	Independence, Kan.	2.40
Kingsport, Tenn.	2.40†	Hannibal, Mo.	2.45
West Des Moines, Iowa	2.40†	Northampton, Pa.	2.40
Nazareth, Pa.	2.40†	Universal, Pa.	2.40
Bath, Pa.	2.40†	Wampum, Pa. (10¢ tax)	2.50

	Bulk		Bulk
Stockton, Minn.	$2.40	Mitchigan, Mich.	$2.50
Leeds, Ala.	2.25	Saginaw, Mich.	2.45
Duluth, Minn.	2.40	Waynesville, Mich.	2.40
Hudson, N.Y.	2.40	Buffalo, N.Y.	2.40
Syracuse, N.Y.	2.25†	Howes, S.D.	2.60
Cleveland, O.	2.40†	Detroit, Mich.	2.40†

	Bulk		Bulk
Toledo, O.	$2.50		$2.40†
Manitowoc, Wis.	2.45		2.50†
Green Bay, Wis.	2.40		2.50†
Ironton, O.	2.40		2.30†
Montreal, Que.	2.60		2.15
W. Winfield, Pa.	2.40†		2.40†

†Prices to bld. for normal quantity at 1950.

PAVING BRICK, BLOCK, ASPHALT, ROAD OILS—F. O. B. CITY

	PAVING BRICK AND BLOCK			PAVING ASPHALT		ASPHALT BINDERS AND FLUXES		CUTBACK ASPHALT		ROAD OIL	ASPHALT EMULSION (Quick breaking)	
	Granite, Per M lots of 50,000 f.o.b. cars	Clay, per M, 4x4x8 in. f.o.b. cars	Wood, per sq. yd. 4½ in. f.o.b. cars	Per ton, less than 80 penetration		Per gal (200/300 penetration)		Per ton		Per gal	Per gal	
	Creosoted	Untreated	Creosoted	Tank car	Drums	Tank car	Drums	Tank car	Drums	Tank car	Tank car	Drums
Atlanta	$71.00	$55.00	$2.25									
Baltimore	140.00‡	97.50‡		$21.00		$.085	$0.11	$.085	$.16	$.085	$.085	$0.11
Birmingham		90.50										
Boston				24.50‡	$33.50‡	103‡	135‡	115‡	205‡	10‡	113‡	205‡
Chicago	155.00‡a	85.00	88.00‡	20.25‡	30.25‡	19.25‡	24.25‡	087‡	166‡	078‡	1025-1075‡	15-1675‡
Cincinnati				19.00		083	098	085‡				
Cleveland		40.00‡	3.43‡	24.00	32.50	24.00‡	33.50‡	100‡	225‡	10	11	23
Dallas	e	40.00	e	23.95	42.95	1012	1498	26.99	47.97	1087	1062	1423
Denver		43.00										
Detroit				26.65		12.00‡		130‡		092		197
Kansas City		40.00‡		18.05‡				07‡	07.50‡	0585‡		
Los Angeles	e		e	17.50‡‡		12.00‡‡		11.00‡		12.50‡‡	0775‡	1375‡
Minneapolis			2.85‡	25.50‡	30.10‡	24.10‡	33.10‡	35.10‡		10‡	12‡	22‡
Montreal	137.00‡	e	e	27.10‡	36.10‡	26.20‡	35.10‡	18.20‡	18.00‡	10.20‡	1745‡	2.10‡‡
New Orleans				16.50‡		10.50‡				0575‡	08‡	1425‡
New York	150.00‡	110.00‡	2.55‡	21.30‡	30.30‡	20.30‡	41.88‡	0910‡	1767‡	0890‡	0910‡	1747‡
Philadelphia	150.00‡	110.00‡	4.00‡	23.00‡		22.00‡		100‡				
Pittsburgh	165.00‡	42.00‡	1.50‡	25.50‡	35.00‡	24.50‡	30.00‡	095‡		095‡	09‡	21‡
St. Louis				24.00‡		23.00‡		15‡		15‡	1085‡	25‡
San Francisco		82.50‡		21.50‡	31.50‡	11.50‡					08‡	14‡
Seattle				25.50‡	35.00‡	15.00‡					085‡	095‡

‡ Discounted. a Less 2% cash. b Less 5% cash. c Less 10% cash. d Less 15% cash. e Dealer distributor. f Bulk, refinery. Englewood, Colo. g Bulk, refinery. Los Angeles. h Bulk, refinery. Englewood, Colo. i Less than 100 penetr. j 40-50 penetr. k Tax included. l Less 2% cash. m Less than 100 penetr. n 40-50 penetr. o Tax included. p Less 2% cash. q Use of used drums. r Use of used drums. s Delivered in steel bbl. t Delivered in steel drums. u Delivered in steel drums per drum. v Less 5% cash. w Delivered in steel drums. x Less 2% cash. y Less 5% cash. z Use of used drums. aa Use of used drums. ab Use of used drums. ac Use of used drums. ad Use of used drums. ae Use of used drums. af Use of used drums. ag Use of used drums. ah Use of used drums. ai Use of used drums. aj Use of used drums. ak Use of used drums. al Use of used drums. am Use of used drums. an Use of used drums. ao Use of used drums. ap Use of used drums. aq Use of used drums. ar Use of used drums. as Use of used drums. at Use of used drums. au Use of used drums. av Use of used drums. aw Use of used drums. ax Use of used drums. ay Use of used drums. az Use of used drums. ba Use of used drums. bb Use of used 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(continued on page 73)

Cities Grow, Too...

Like a growing boy, most cities today are "busting out at the seams"

TAKE a look at your city. Industry needs room to grow. Residential areas are swollen with new population. Yesterday's roads don't fit today's traffic and transport problems.

The old town needs a new suit of clothes—*up-to-date maps* to provide city planners with *up-to-the-minute information*. But the costs of collecting new map facts by conventional methods are high. No city can afford to wait years for maps needed *now*.

Aero Service and its highly skilled engineers can meet your mapping needs with speed, accuracy, and economy. Our aerial mapping methods deliver reliable topographic maps in a matter of months—*not years*—at less than half the cost of ground surveys. Your city planning can move ahead swiftly—at the lowest possible cost to the taxpayer.

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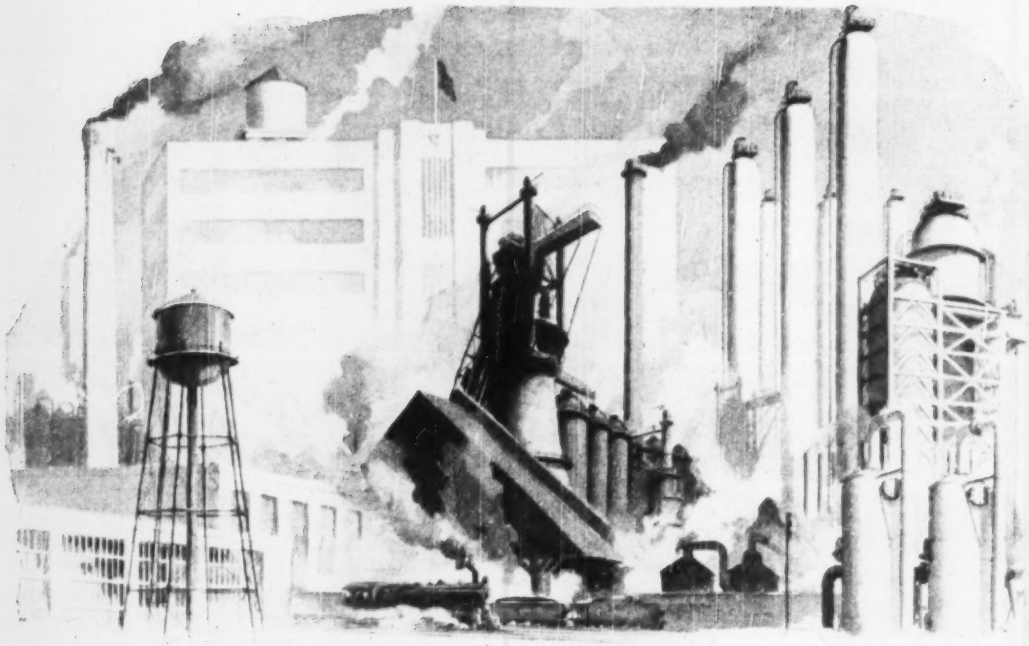
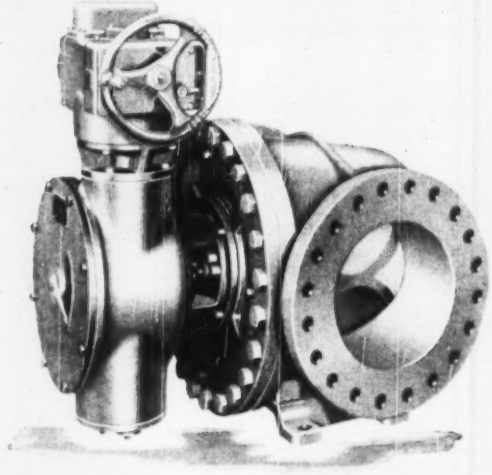


INDUSTRY *and the*

ROTOVALVE

MARCHING toward new goals—in a mechanized manufacturing world—industrialists, engineers, plant managers and management of all kinds are exploring every means of cutting costs and increasing efficiency. This explains the great demand and use of Rotovalves. Their design permits the conical plug to lift, rotate and seat itself, and assures free flow through a full circular opening in both valve body and plug, thereby cutting losses.



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S. MORGAN SMITH Co.

YORK, PENNA. U.S.A.

IRON AND STEEL PRODUCTS—PER 100 LBS. BASE MILL PRICES

	STRUCT. SHAPES, PLATE*	REINF. BARS	RIVETS	SHEET PILING	STEEL RAILS (Per Net Ton)			TRACK SUPPLIES		
					Standard	Light	Relaying	Angle Bars	Std. Spikes	Tie Plates	Track Bolts
Birmingham Area	$3.40	$3.45	$7.25		$88.00	$75.00	Not	$4.40	$5.00	$4.20	
Chicago Area	3.40	3.45	7.25	$4.20	88.00	75.00	avail.	4.40	5.00	4.20	
Pittsburgh Area	3.40	3.45	7.25	4.20	88.00	75.00	able	4.40	5.00	4.20	
Buffalo Area	3.45	3.45	7.25	4.20	88.00	75.00		4.40	5.00	4.20	$8.85
Cleveland			7.25								8.85
Youngstown Area		3.45							5.00		
Geneva	3.40										
Los Angeles		4.15							5.00		
Pueblo	3.40	3.45			88.00	75.00		4.40	5.00	4.20	8.85

IRON AND STEEL PRODUCTS—F. O. B. WAREHOUSE, PER 100 LBS., BASE PRICE

	STRUCTURAL SHAPES	REINFORCING BARS			EXPANDED METAL LATH		WELDED FABRIC REINFORCING‡		
	Per 100 lb. Base price	Per 100 lb. Base price*			Per 100 sq. yd. carload lots		Per 100 sq. ft. carload lots		
		5 tons or carload lots	Mill extras	$ cwt. fob	Painted	Galv.	4x16 in. No.	4x12 in. No.	No.
	Base price	New billet	Rail steel	mesh	Del.	4.0	4.0	5 & 10 wire	5 & 12 wire	6 & 6 wire
Atlanta	$4.75	$5.225§	$5.225§	$.025	$.10	$51.50	$51.50			
Baltimore	5.50	4.95‡			.10	40.00	43.00			
Birmingham	5.20	5.15	5.15	.05	.15	43.00	45.50			
Boston	5.25‡	5.65‡	5.565‡		.10/.15	32.00	33.00			
Chicago	5.05	4.40‡	4.40‡	.0625		32.00‡	34.50‡			
Cincinnati	5.00‡	5.00‡				53.00‡	55.00‡			
Cleveland	5.17	4.47‡			.10	34.00	36.50			
Dallas	6.75	5.30	5.30			43.50	46.00			
Denver	6.45	6.65‡				48.00	47.00‡			
Detroit	5.04‡	5.00‡			.10	33.00	35.00			
Kansas City	5.65‡	5.30‡				39.00	41.00‡			
Los Angeles	5.40§§	5.40‡			.15	38.00	40.00§§			
Minneapolis	5.15§§	4.92‡	4.92‡		.15	35.50	37.50			
Montreal	6.75‡	4.75‡	4.75‡			44.10‡	46.80‡			
New Orleans		5.00‡		.05	.10	38.50	41.00			
New York	5.15‡	5.38	5.33		.20	33.50‡	38.00‡			
Philadelphia	5.22	5.22				34.49‡	36.49‡			
Pittsburgh	4.90-5.00	4.90-5.00			.10	32.50	34.50			
St. Louis	5.00‡	5.32‡	5.02‡			42.00‡	45.00‡			
San Francisco	6.05§§	5.75§			.15	47.50	50.00			
Seattle	5.60‡	5.15‡				52.00§§	42.00§§‡‡			

PLUMBING, HEATING, WATER, SEWER AND DRAIN PIPE

	C. I. PIPE	VITRIFIED SEWER PIPE Per foot, Delivered ASTM C13-44T				CLAY DRAIN TILE ASTM C4-24		CONCRETE SEWER PIPE	
	Per net ton f.o.b. 6 in. and 8 in. to 24 in.	std. 8 in.	std. 12 in.	24 in.	36 in.	Per 1,000 ft., carload lots, f.o.b. 6 in.	8 in.	Per ft., delivered ASTM C 14-41 12 in.	24 in.
Atlanta	$80.50	$0.43	$0.67	$3.39	$7.00	$114.00	$140.00	$0.45	$2.00
Baltimore	93.86	51	98	3.95	10.00	220.00	341.00	80	2.25
Birmingham	82.50	40	75	2.84		240.00‡	375.00‡	60	2.50
Boston	97.46	41¾ez	85⅝ez	3.60ez	10.00ez	173.00	267.00	1.45‡ma	3.60‡ma
Chicago	66.49	54	1.03	4.25	13.25	150.00‡	270.00‡	70	2.35
Cincinnati	94.90	455	877	3.555	10.50	160.80‡	257.70‡	60	2.25‡
Cleveland	97.13	357‡	685‡	3.015‡	8.405‡	140.00	219.00	72 m	2.75m
Dallas	99.28	665	652	2.63	6.25			49	1.60
Denver	104.38	4144	7144	2.9644				7444	2.5066
Detroit	92.23	545	1.055	4.19	12.10	200.00m	310.00m	65	2.50
Kansas City	98.41	418m	73m			215.00m		604	2.10‡
Los Angeles	111.06	426	727	4.532	11.258	163.60‡	324.60‡	72	2.05‡
Minneapolis	91.86-100.67	62me	1.12me	4.5me				1.26A	3.67A
Montreal	90.00	77x	1.35x	4.47x	7.23ex			72.00‡ax	218.00‡Ax
New Orleans	92.85	453	82	4.10	8.85*	235.00§§	412.00§§	65	2.25‡
New York	92.50-97.50	55	1.10	4.25	11.60			1.00	2.50
Philadelphia	90.47	54	99	4.08	10.28	235.00‡	300.00‡	1.25A	3.20A
Pittsburgh	97.56	56m	70m	2.70m	6.65m	147.50	230.00	1.05A	2.50g
St. Louis	94.27	48	92	4.80	9.00			1.15d	2.45Ad
San Francisco	111.96	55‡	1.08‡	4.68‡	11.70‡	195.00§§	325.00§§	90	2.85
Seattle	112.95	51‡	91‡			130.00‡		81ee	2.40ee

*WROUGHT STEEL PIPE

Full standard weight

	Mill	Lorain, Ohio	Aliquippa, Pa.	Conshohocken, Pa.	Donora, Pa.	Ellwood City, Pa.	Gary, Ind.	Pittsburgh, Pa.	Sharon, Pa.	Youngstown, Ohio	Threaded and coupled	Plain ends
2½ in. Black												
2½ in. Galv.												
4 in. Black												
4 in. Galv.												
12 in. Black												
12 in. Galv.												

2½ to 4 in. A Continuous

‡Delivered ... ASTM A-53 ... Class B and heavier. C.I. Birmingham, N.J. ... $87.50 ... Based on ... freight ... Class A, $8 per ton additional ... $8 per ton additional ... $8 per ton ... $8.00 ... $8 per ton ... $8.00 ... ASTM A-74 ... Class ... ASTM A-74 ... Centrifugal ... Per 100 ft. ... Less than ... per price per ft. ... With ... ASTM C14-41 ... specifications ... No. Standard ... Class ... Delivered ... Reinforced ... ASTM C76-41 ... Class ... ASTM C76-41 ... Centrifugal ... Per 100 ft. ... Less than ... per price per ft. ... With ... ASTM C14-41 ... specifications ... No. Standard ... Class ... Delivered ... Reinforced ... ASTM C76-41 ... Class ... ASTM C76-41 ... Centrifugal ... Per 100 ft. ... Less than ... per price per ft. ... With ... ASTM A-53 ... Class B and heavier. C.I. Birmingham, N.J. ... $87.50 ... Based on ... freight ... Class A, $8 per ton additional ... $8 per ton additional ... $8 per ton ... $8.00 ... $8 per ton ... $8.00 ... ASTM A-74 ... Class ... ASTM A-74

LUMBER, TIMBER, PLYWOOD—PER M FT., B.M., CARLOAD LOTS F. O. B.

SHORT LEAF YELLOW PINE AND DOUGLAS FIR

All S. L. Y. P. is No. 2 common or better and for No. 1 N. C. Box. Prices in Bold Face)
All Fir boards, dimension, planks No. 2, Fir small timbers and timbers are No. 1. Lengths up to 20 ft.
(Prices in italics)

	1x6 s4s	1x8 s4s	2x4 s4s	2x6 s4s	2x8 s4s	2x10 s4s	3x12 Rgh	6x12 Rgh	12x12 Rgh
Atlanta †	**$70 00**	**$71 00**	**$60 00**	**$62 00**	**$65 00**	**$68 00**	**$76 00**		
Baltimore	**69 00**	**72 00**	**60 00**	**60 00**	**60 00**	**65 00**	**87 50**		
	98 00q	*96 00q*	*89 00q*	*89 00q*	*89 00q*	*89 00q*	*89 00q*	*$84 50*	*$84 50*
Birmingham	**73 00**	**76 00**	**63 00**	**65 00**	**68 00**	**75 00**	**85 00**		
	68 00	*85 00*	*65 00*	*65 00*	*65 00*	*65 00*	*81 00*	*81 00*	*81 00*
Boston	**86 00**	**86 91**	**91 00**	**91 00**	**91 00**	**96 00**			
	91 95	*91 95*	*95 95*	*91 85*	*91 85*	*101 105*	*101 105*	*101 105*	*101 105*
Chicago ‡	**83 85**	**85 86**	**75 76**	**84 85**	**86 87**	**88 89**	**92 00**		
‡	**88 00**	*92 93*	*80 81*	*90 91*	*92 93*	*94 95*	*88 90*	*88 90*	
Cincinnati	**76 00**	**76 00**	**76 00**	**78 00**	**82 00**	**85 00**	**93 95**		
	98 00	*98 00*	*98 00*	*98 00*	*98 00*	*98 00*		*98 00*	*98 00*
Cleveland	**80 00**	**82 00**	**72 00**	**81 00**	**82 00**	**84 00**	*90 00*	*95 00*	*95 00*
Dallas ‡†	**60 00**	**66 00**	**61 00**	**53 00**	**56 00**	**57 00**	**90 00**		
Denver	Not in stock		*56 00*	*54 00*	*54 00*	*54 00*	*108 00*	*118 00*	*116 00*
Detroit	**80 00**	**83 90**	**80 00**	**81 00**	**83 00**	**84 00**			
	88 00	*88 00*	*90 00*	*89 00*	*89 00*	*88 00*	*94 00*	*97 00*	*97 00*
Kansas City	**98 00**	**105 00**	**105 00**	**112 00**	**115 00**	**117 00**			
#	*98 00*	*105 00*	*100 00*	*110 00*	*110 00*	*118 00*	*120 00*	*130 00*	*130 00*
Los Angeles *	*90 00*	*90 00*	*84 00*	*88 00*	*88 00*	*88 00*	*112 00*	*127 00*	*112 00*
Minneapolis ‡#	*115 00*	*115 00*	*115 00*	*115 00*	*115 00*	*110 00*	*125 00*	*125 00*	*125 00*
Montreal ‡§	70 00	74 00	70 00	72 00	75 00	83 00			
	140 00	*140 00*	*140 00*	*140 00*	*140 00*	*140 00*		*155 00*	
New Orleans †	**66 00**	**70 00**	**70 00**	**75 00**	**75 00**	**70 00**	*85 00*		
†	*68 70*	*68 70*	*74 00*	*75 00*	*78 50*	*78 50*	*87 00*	*87 00*	*100 00*
New York ‡	**92 97**	**95 100**	**87 50 92 50**	**90 95**	**95 100**	**97½ 102½**	**115 125**		
‡			*Range from $x 100 to $100.00*				*97 50 105*	*105 120*	*105 120*
Philadelphia			**Range from $88 00 to $97.00**				**88 97**		
			Range from $100 00 to $115 00				*105 115*	*105 115*	*105 115*
Pittsburgh †	**75 85**	**75 85**	**75 85**	**75 85**	**75 85**	**80 90**	**100 00**		
†	*90 100*	*90 110*	*90 100*	*90 100*	*90 110*	*100 110*	*120 130*	*120 00*	*120 00*
St. Louis ‡	**87 75**	**89 75**	**79 50 85 50**	**88 25**	**90 50 93 75**	**93 25 97 50**			
‡			*105 Portland*	*100 25e*	*100 25e*	*105 30e*	*115 00e*	*120 50*	
San Francisco †	*85 90*	*85 90*	*85 90*	*88 00*	*88 00*	*85 90*	*85 00*	*85 00*	*85 00*
Seattle †	*90 00q*	*90 00q*	*90 00q*	*90 00q*	*90 00q*	*90 00q*	*95 00q*	*95 00q*	*95 00q*

† Delivered. ‡ Retail f.o.b. * Yard prices.

TIMBER: **Bold Face type, Southern Pine**; *Italics, Douglas Fir*. a Spruce. b Tax exempt. c M bds. d 8-12 ft. lengths. e 8-16 ft. lengths. f 18 ft. or over. g No. 1 common. h 35x12 ft. lengths. i 40-16 ft. lengths. j 40-16 ft. lengths. k No. 1 common.

PLYWOOD: Special concrete form grade Fir Plywood, 4' by 8' panels, 5-ply, sanded 2 sides, water resistant glue, carload lots, delivered per 1,000 sq. ft. surface—Seattle base price on ½" $105.00.—on ⅝" $105.00.—For other centers, add rail freight increment from table on proper size. Oiling and edge sealing charges included. x Lower rate by water shipment. 5,000 sq. ft. minimum.

* Freight rate increase of 6c per cwt., not included in these figures.

GLASS, EXPLOSIVES, CHEMICALS

	WINDOW GLASS: Discounts from jobbers list, Feb. 1, 1950a, Single or Double Thickness, A quality	B quality	EXPLOSIVES: Per lb. 40% Ammonia Gelatin in 50 lb. cases delivered in 200 lb. lots*
Atlanta	76%c		$0.2025
Baltimore	80-10%c	82-10%	.2025
Birmingham	67%c	67%c	.1775
Boston	66%c	66%c	.2025
Chicago	81%c	81%c	.2025
Cincinnati	81-10%	81-10%	.2025
Cleveland	81-10-10%	81-10-10%	.2425
Dallas	65%	65%	.2175
Denver	68-5%	68-5%	.2075
Detroit	81-10-10%	81-10-10%	.2025
Kansas City	65-10%b	65-10%b	.2075
Los Angeles	56%c	61%f	.21
Minneapolis	80-10%	80-10%	.2075
Montreal	40-5%bc	40-10-5%bc	18 1/4d/e
New Orleans	81%	81%	.2125
New York	81%	81%	.32g
Philadelphia	69%c	70%c	.2025
Pittsburgh	82%	82%	.175
St. Louis	70-10%c	70-10%c	.2075
San Francisco	66%c	73%c	.2075
Seattle	74%c	55%c	.21

Price of 60% Ammonia Gelatin is $0.0125 per lb. higher than 40%

Glass: a Jobbers' list price per box 14 x 20 in. $12.75 for A quality, $7.50 for B quality; 14 x 20 ds. $6.00 for A quality, $2.75 for B quality. b Discount from list Sept. 1939; sales tax included, but 6% tax exemption not allowable for ... single thickness. c Discount from list of Jan. 16, 1946. ... ds—double strength. e Discount from list of Jan. 16, 1946. ... ss—single strength. f Discount from list of Nov. 15, 1948. ... ds—double strength.

Explosives: * Urban prices influenced by service charges or local storage and delivery regulations do not consistently reflect quantity prices in less congested areas. a In borough of Bronx, Queens and Richmond and in Manhattan south of Canal St., add delivery charge of $0.01 per lbs. b 1-5 cars per 100 lb. lots. c Danville $0.20. d $0.20 in Jersey City and Montreal.

40% Ammonia Gelatin price ranges in other than urban areas, per lb. except Seismograph Grades:

	(C.L. 20,000 lb. net)	Tons	200 lb. lots
E. of the Miss. except Fla. and Me.	$0.155	$0.1825	$0.2025
W. of Miss. to Rocky Mtn. States			
Fla. and Maine	.16 .1675	.1875 .20	.2075 .22
Rocky Mtn. States	.16 .1725	.1875 .20	.2075 .225
Pacific N. W. States	.1575 .17	.19 .2025	.21 .2225
Pacific S. W. States	.155 .1625	.1875 .198	.2075 .2175

PILES, TIES F. O. B.

PILES

Prices per linear foot, fir and pine, bark off, f.o.b. cars, New York. Fir based on Wash. and Ore. points to New York shipping area; pine based on freight from Norfolk.

Dimensions	Points	Length	By Rail—Pine*	By Rail—Fir
12-in. at butt	6-in.	30 to 50-ft.	$0.43	....
12-in.—2-ft. from butt	6-in.	50 to 55-ft.	.46	....
12-in.—2-ft. from butt	6-in.	60 to 65-ft.	.50	....
12-in.—2-ft. from butt	6-in.	90 to 100-ft.	....	.79
13-in.—3-ft. from butt	5-in.	91 to 100-ft.	....	.80
14-in.—2-ft. from butt	6-in.	50 to 60-ft.	.50	.87
14-in.—2-ft. from butt	6-in.	70 to 75-ft.	.54	.81
14-in.—2-ft. from butt	5-in.	80 to 85-ft.	.67	.82
14-in.—2-ft. from butt	5-in.	85 to 89-ft.	....	.83
14-in.—2-ft. from butt	5-in.	90 to 100-ft.	....	.87

* Pine piling over 80-ft. available only in limited quantities.

RAILWAY TIES

Prices f.o.b. per tie for carload lots:

		6"x8"x8'-		7"x9"x8'6"	
		Untr.	Tr	Untr.	Tr
Boston	Oak	x			
	Pine	x			
New York	S. L. Sap Pine	$1.65	$2.85	$2.00	$3.30
	Mixed Oak	1.80	3.05	2.50	3.60
Birmingham	Hardwood	1.00	1.60a	....	2.25a
Chicago	Red Oak	2.50	2.60a	3.52	3.45a
Los Angeles	Douglas Fir				
	Redwood				
Philadelphia	Red Oak	2.33	3.13a	3.10	4.25a
St. Louis	White Oak	2.45		3.15	
	Red Oak	2.35	3.05a	3.05	3.55a
	Sap Pine or Cypress	2.85a		3.70	
San Francisco	Douglas Fir	1.28c	2.24c/f	1.70bf	3.05caf
Montreal	Birch or Maple	x	x	x	x

Tr.—Treated. Untr.—Untreated. a Creosoted. b 7"x 9" x 8'. c Empty cell. e Green. f F.o.b. cars. x No constant price available. x Not available

CHEMICALS

Water, sewage treatment, road work, f.o.b. carlots, New York

Bleaching powder in drums f.o.b. works per 100 lb.	$4.50
Chlorine cylinders, liquid, per lb. f.o.b. works	.07- .12
Quicklime, chloride 77-80%, flaked, 100 lb. paper bag, f.o.b. works, ton	22.00
Silicate of soda, 52 deg. in drums f.o.b. works, per 100 lb.	1.80
Soda ash, 58% in paper bags per 100 lb. dense	1.35
Sulphate of aluminum, commercial in 100 lb. bags f.o.b. works	1.50
Sulphate of copper, in bags 99% per 100 lb. f.o.b. works	7.00

DID YOU SAY "WHO-O-O?"

It's U.S.G. roof deck contractors, of course...who build

SHEETROCK-PYROFILL

T. M. Reg. U. S. Pat. Off.

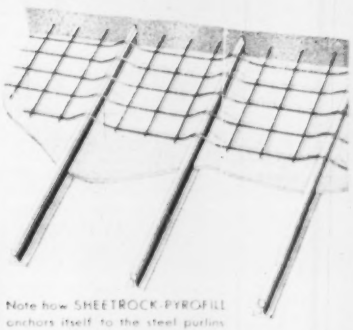
poured-in-place gypsum roof decks

It's always wise to stick to the specifications . . . and specifications that call for SHEETROCK-PYROFILL call for your U.S.G. roof deck contractor. *For only U.S.G. roof deck contractors can install* SHEETROCK-PYROFILL *roof decks.*

Not only does the roof deck they build meet the most exacting requirements because it's incombustible, lightweight, strong, and easy to maintain . . . it meets your construction schedule because SHEETROCK-PYROFILL is quickly installed—up to 20,000 feet poured a day—and sets in less than 30 minutes.

Besides SHEETROCK-PYROFILL, U.S.G. roof deck contractors also erect roof decks of U.S.G. Precast Metal Edge Gypsum Plank and Short Span Tile.

For the name of your U.S.G. roof deck contractor, write Industrial Sales Division, United States Gypsum Company, Chicago 6, Illinois.



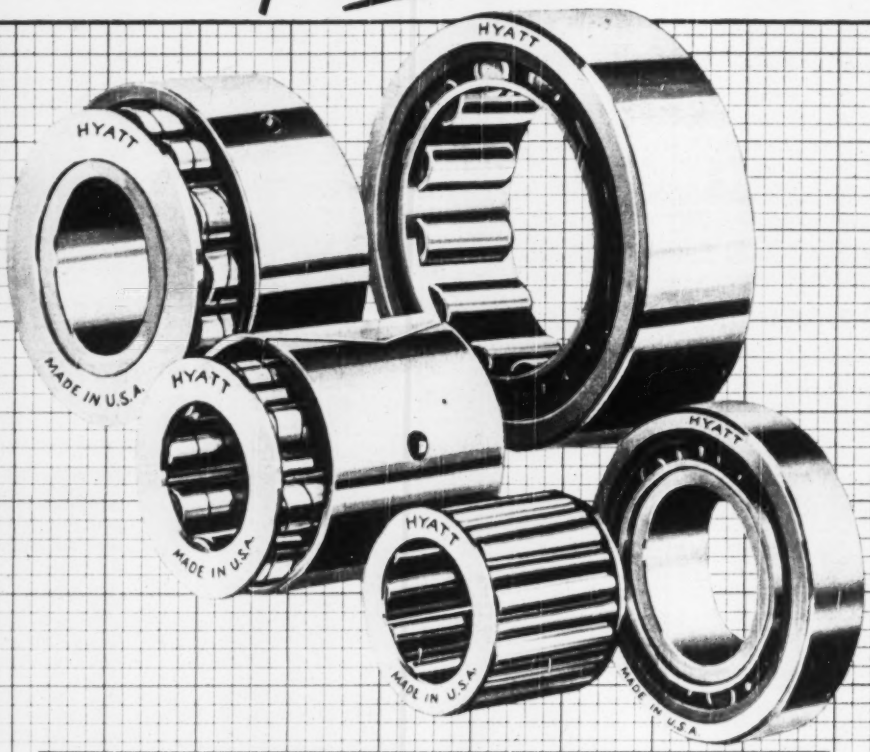
Note how SHEETROCK-PYROFILL anchors itself to the steel purlins

United States Gypsum

For Building • For Industry

Gypsum • Lime • Steel • Insulation • Roofing • Paint

HYATTS *pay off* in performance



Hyatt Roller Bearings are purposely designed and built *first* to *last*.

And in every application, Hyatts have proved their correct design and built-in quality by their profitable performance in endless types of machines and equipment.

Profitable to the user because of their long-life, ease of maintenance, economy in lubrication and freedom from idle time. Wherever Hyatts are used and for more than half a century in all kinds of applications, it has been proved that Hyatts pay off in performance. Hyatt Bearings, Division, General Motors Corporation, Harrison, New Jersey.

HYATT ROLLER BEARINGS

STRUCTURAL CLAY BUILDING TILE, BRICK AND LIME—DELIVERED

	STRUCTURAL CLAY TILE — PARTITION — SCORED			STRUCTURAL CLAY TILE — LOAD BEARING — SCORED			BRICK		LIME		
	Per M (lots of 2,000 pieces or over)			Per M (lots of 2,000 pieces or over)			Per M (f.o.b. plant/dry)		Per ton (f.o.b. plant/in paper bags)		Carload lot (f.o.b. plant/in bulk)
	2x12x12 in.	4x12x12 in.	8x12x12 in.	8x12x12 in.	10x12x12 in.	12x12x12 in.	Common backing	Structural facing	Hydrated finishing	Common hydrated	Pulverized or lump
Atlanta							$25.00	$25.00	$19.00	$17.50	$17.50
Baltimore	$175.00	$185.00	$325.00	$380.00			33.00a	35.00a	26.00	20.00	
Birmingham	97.50	104.00	195.00	231.00			20.00f	22.50g	24.74	16.30	
Boston	140.00i	140.00i	280.00i	317.00i			32.00a	35.00a	30.80i	25.40i	
Chicago	115.00	122.50	240.00				21.00	23.00	28.50	23.00	
Cincinnati	170.00	180.00	240.00dd	295.00			32.25j	44.00r	24.25j	24.25j	24.25
Cleveland	118.00ee	126.00ee	236.00ee				28.50	28.50	24.00	22.00	27.50ee
Dallas		110.00					18.75	33.25	31.50	21.50	
Denver							32.00	32.00	34.50kk	25.00kk	34.00kk
Detroit	117.08	124.58	234.15		$280.80	$312.22	32.50ee	33.00ee	28.80	26.50	
Kansas City	115.50	122.50		245.00	303.50	367.00	24.25n	24.25n	30.00p	32.00p	30.00p
Los Angeles							30.00§		36.00	30.00	32.00
Minneapolis	158.00p	176.00p	330.00p	176.00aap			30.00ap	34.00	35.00ffe	26.00ffe	35.00ffde
Montreal	115.00aq	125.00aq	255.00aq				25.50	33.50	22.40u		22.40
New Orleans	160.00	160.00	300.00				29.00		38.00	26.00	37.50
New York	118.20A	126.00A	171.30A	189.50An			33.00		34.40	25.80	
Philadelphia	126.30	134.80	252.60	302.74	361.35	455.74	27.00	30.00	31.00	19.50	24.50
Pittsburgh	98.00	105.00	181.85	202.00	265.35	303.60	26.00	38.00g	23.00	19.00	2.97m
St. Louis	120.00	135.00	252.00	252.00	339.00		32.50ss	39.50ss	60.50ssaaa	50.50ssaaa	1.00zzzspoe
San Francisco	132.00u	148.50u	198.00uddu	148.50uu			33.00t		25.30t	23.30t	2.40m
Seattle	150.00ee	160.00ee		160.00eeee			32.00e	39.00e	34.00eAA	34.00eAA	3.00mAA

† Each yard. Hartford. a Smooth. b Per 20 ft. base. c 6x12x12 2.54; 8x8x12 3.11. d Tax exempt. e Standard brick. f 8x8x12 2.50. g 8x8x12 3.00. h Delivered but not unloaded. i Bulk following month. j 8x8x12 2.75. k Delivered to job. l Delivered but not unloaded. m Ton. n Truck delivery. o 8x8x12 2.50. p Delivered to job. q Delivered to job. r Delivered to job. s Truck load in metropolitan area. t Truck load in metropolitan area. u Delivered to job. v Delivered to job. w Delivered to job. x Delivered to job. y Delivered to job. z Delivered to job. aa Delivered to job. ab Delivered to job. ac Delivered to job. ad Delivered to job. ae Delivered to job. af Delivered to job. ag Delivered to job. ah Delivered to job. ai Delivered to job. aj Delivered to job. ak Delivered to job. al Delivered to job. am Delivered to job. an Delivered to job. ao Delivered to job. ap Delivered to job. aq Delivered to job. ar Delivered to job. as Delivered to job. at Delivered to job. au Delivered to job. av Delivered to job. 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PAINT, ROOFING—F.O.B. CARLOAD LOTS

	RED LEAD	WHITE LEAD	READY-MIXED PAINT			ROOFING, SIDING, INSULATION (Carload lots f.o.b. factory)				
	Per 100 lb in 600-lb. Approx. 5 lb. Orcs a	Per 100 lb in 100-lb. kegs	Per gal. drums Graphite b	Aluminum c	Ferric Oxide d	Roofing, slate surfaced, 55 lb. per sq.	Asphalt felt, per 100 lb.	Tar felt, per 100 lb.	Asphalt coating, per gal.	Tar pitch, 300 lb. bbl. per ton
Atlanta	$14.50	$21.25	$1.75	$2.70	$1.65	$2.00‡	$2.00‡	$2.00‡	$1.00‡	$36.00‡
Baltimore	14.25ee	24.00	2.10	4.27	2.90	2.06	1.94	.94	.55	36.00
Birmingham	14.50	23.25	3.90	3.40		2.80	2.75			40.00ee
Boston	14.25	24.00				2.65‡	2.67½‡	.96	.54	34.00
Chicago	14.25	24.00				2.14‡n	2.54‡n	2.54‡n	.44 .00‡bbe	32.00
Cincinnati	14.25	24.00	2.00	2.90		2.41‡	2.51‡n	2.54‡n	.35½‡	40.00
Cleveland	14.25	24.00	2.50ee	2.75eee	2.35	2.30	2.30	2.30	.30½	34.00
Dallas	14.25	23.50		4.08		3.50x	3.75	4.00	.50	46.00
Denver	14.75	25.00	1.63	4.38	2.48	3.20x	2.80	2.80	.41½	40.00
Detroit	14.25	24.00	2.35	3.50	2.50	2.20	2.29	2.29	.41⅝	35.00
Kansas City	14.25	25.00							.65	
Los Angeles	14.25	25.20	2.80	3.75	3.80	2.41	1.91x		.50ddf	
Minneapolis	14.25	25.00 28.55				2.20ddd	2.20ddd	2.20ddd	.50ddf	.34.00e
Montreal		22.00	3.75f	4.20f	3.62f	3.25f	3.00f	3.00f	.70f	2.60.00f
New York	14.25	24.00	3.45g			2.32	2.40	2.40	.34g	35.00
Philadelphia	14.25	24.00	3.25	3.65	3.15	2.34	2.34	2.34	.37	36.00
Pittsburgh	14.25	24.00	2.00	2.90	1.90	2.75	2.81x	2.81x	.37	38.00
St. Louis	14.25	24.00				2.30	2.30A	2.30A	.38	37.00
San Francisco	14.25	25.20	1.80	2.75n	1.35	2.27	3.00x		.39g	
Seattle	14.25	24.45	2.35m	2.67m		3.23mgee	2.75mee		.36mee	48.25 me

‡ Delivered. Note: Red lead in oil 50¢ lighter than white lead in oil. a Red lead prices change frequently due to current price changes. b U. S. War Dept. Spec. 3-49A. c ASTM Spec. D260-47T. d 80% minimum ferric oxide. e 15 lb. f Per 432 sq. ft. g Per roll, 95 lb. h Net carload lot prices. i Approximate cost per 100 lb. in Boston, coating and felt. j Per 432 sq. ft. k Per 108 sq. ft. l Per ton, delivered. m 2% discount. n Asphalt in Detroit, Minneapolis and vicinity. o Asphalt prices. p Per cwt. Net, paid. q Max. 194 price. r Per 90 lb. s Felt in package. t 5% discount for cash. u Per 100 lb. v Per 90-lb. roll. w Felt, factory, Chicago. x ASTM Spec. D250-41. y Federal tax included. z Per 100 lb. aa Prices to large paint contractors. bb $1.25 case. cc Mineral-surfaced. dd Asphalt in 100-lb. ee Approximate cost per 100 lb. in Boston, coating and felt. ff Per 100 lb. gg Per gallon container. hh Delivered. ii 25% discount. jj Asphalt in 100-lb. kk 2% discount. ll Asphalt in 100-lb. package. mm Steel drums. nn Felt, factory.

SKILLED AND COMMON WAGE RATES—PER HOUR

	Bricklayers	Carpenters	Struct. Iron Workers	Hoisting Engineers	Plasterers	Electrical Workers	Steamfitters	Common Labor — Building	Common Labor — Heavy Const.
Atlanta	$2.50	$1.85	$2.125	$2.00	$2.25	$2.25	$2.00	$0.90	$0.95
Baltimore	3.00	2.35	2.65	2.40 2.80	2.50	2.40	2.40	1.35	1.35
Birmingham	2.50	1.90	2.20	1.87	2.20	2.15	2.25	1.00	1.10
Boston	2.775	2.25	2.55	2.60	2.70	2.60	2.65	1.75	1.75
Chicago	2.55	2.45	2.50	2.45	2.55	2.525	2.45	1.80	1.80
Cincinnati	2.575	2.25	2.425	2.375	2.425	2.45	2.40	1.535	1.535
Cleveland	2.70	2.575e	2.70	2.70	2.70	2.70	2.70	1.925	1.85
Dallas	2.50f	2.125	2.25	2.25	2.50f	2.375	2.425	1.075	1.275 1.50
Denver	3.00	2.10	2.30	2.25	2.50	2.41	2.40	1.40	1.15
Detroit	2.75	2.325	2.575	2.575	2.625	2.60	2.50	1.80	1.80
Kansas City	2.65	2.20	2.30	2.425	2.80	2.475	2.55	1.025	1.025
Los Angeles	2.925	2.12	2.35	2.07	3.125	2.90	2.90	1.87	1.87
Minneapolis	2.40	2.12	2.25	2.07	2.50	2.35	2.32	1.52	1.52
New Orleans	2.50	1.875	2.25	2.125	2.375	2.30	2.25	1.025	1.025
New York	3.200	2.750	3.00	3.00	3.200	3.00g	2.750	1.70	1.70
Philadelphia	3.00	2.34 2.40	2.50	2.50	3.00	2.75 3.00	2.75	1.375	1.675
Pittsburgh	3.00	2.50	2.625	2.56	2.625	2.575	2.50	1.50	1.50
St. Louis	2.533	2.456	2.50	2.55	2.50	2.556	2.50	1.60	1.50 1.75
San Francisco	3.150	2.225	2.50	2.19	3.00	2.50	2.50	1.55	1.55
Seattle	3.00	2.195	2.195	2.13	2.495	2.190	2.50	1.295	1.43
Montreal*	1.40	1.25	1.25	1.20	1.40	1.35	1.55	.90	.90

a 6 hr. day. b 7 hr. day. c Prefab. 3/4". d Carpenter stamp. Empl. for bricklayers 2%, for electricians 3%. e Cost of living bonus now applied in base wage. f Includes 5¢ per hr. fund replacement. g Plus $1.00 daily bonus. * $5.20 bonus and housing. ** 5¢ vacation fund. † Incl. 2% welfare.

MEXICO CITY PRICES

In Pesos, F.o.b. City		Mar. '50	Apr. '50
Common Wages—Building			
(8 hr. day)	av. per hr.	.53	.53
Common Wages—Heavy Const. (8 hr. day)	av. per hr.	.60	.60
Skilled Labor Wages			
Carpenters (8 hr. day)	av. per hr.	1.88	1.88
Bricklayers (8 hr. day)	av. per hr.	1.50	1.50
Struct. Iron Workers (8 hr. day)	av. per hr.	1.90	1.90
Struct. Steel Stages			
3" 15" x 12 meters	per ton	925.25	925.25
Reinf. Steel, Corr. Rods			
⅜" x 11 meters	per ton	1,010.00	1,025.00
½" x 11 meters	per ton	1,000.00	1,015.00
⅝" x 11 meters	per ton	990.00	1,005.00
¾" x 11 meters	per ton	980.00	1,005.00
⅞" x 11 meters	per ton	980.00	1,005.00
1" x 11 meters	per ton	980.00	1,005.00
Gravel, truck load of 3½ cu. meters			
Fine gravel	per tr. load	11.00	12.00
Rock gravel	per tr. load	13.00	14.00
Cement, Std. Port. (Tolteca)	per ton	120.00	122.00
Lumber			
Mex. Sawed Fir (Imported)	per M ft.	400.00	400.00
1st Class Pine	per M ft.	360.00	360.00
2nd Class Pine	per M ft.	480.00	480.00

ENR Skilled Average: Bricklayers $2.50; Carpenters $2.00; Iron workers $2.18. **ENR Common Average:** $1.

CONSTRUCTION REPORTS

Bids Asked—Low Bidders—Contracts Awarded

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

ELSIE EAVES, Manager J. A. MAHONEY, Reports M. R. ROESSLER, Statistics

WATER SUPPLY

BIDS ASKED

CONTRACTS AWARDED

BRIDGES

BIDS ASKED

LOW BIDDERS

CONTRACTS AWARDED

STREETS AND ROADS

BIDS ASKED

LOW BIDDERS

CONTRACTS AWARDED

SEWERS, WASTE DISPOSAL

BIDS ASKED

LOW BIDDERS

CONTRACTS AWARDED

PROJECTS COVERED

Projects—By Size

Classes of Construction

Stages Reported

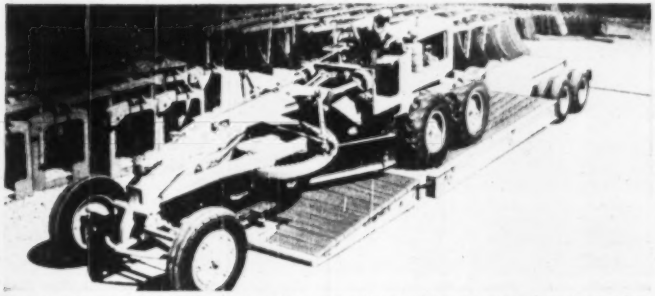
Symbols and Abbreviations Include:

▲
ENR
CD

(Continued on page 80)

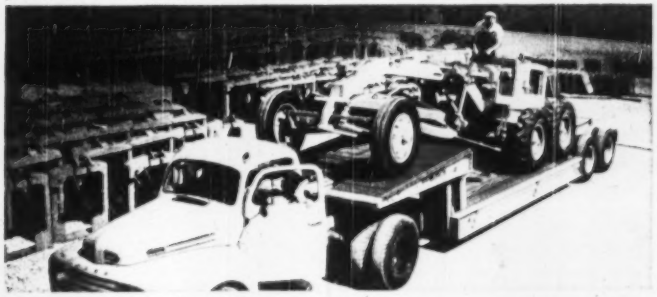
LOADING MOTOR GRADERS MADE EASY BY FOLDING GOOSENECK

Loading equipment quickly, and without ramps or cribbing is possible with a new patented "Carryhaul" Folding Gooseneck recently introduced by the Martin Machine Company, Kewanee, Illinois. The new trailer features a Folding Gooseneck which, when lowered to the ground, forms a loading ramp. Front end loading permits a very low platform height, assuring greater safety, greater clearance of viaducts, bridges, wires. The new trailer is available in capacities up to 100-tons. Like other Martin "Carryhaul" trailers the new Folding Gooseneck is being sold exclusively through "Caterpillar" dealers everywhere.

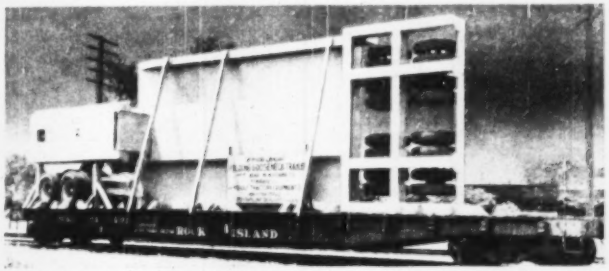


New Folding Gooseneck lowered to form ramp for loading motor grader. No loading ramps or cribbing are required. Loading is completed in a few minutes.

Below: Folding Gooseneck raised to towing position. Low platform height offers greater clearance, safety.



World's Largest Folding Gooseneck Trailer



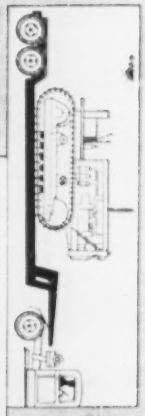
Loaded for shipment to Humble Oil Company, West Baytown, Texas, this 65-ton Martin Folding Gooseneck trailer stood 17 ft., 4 in. high on the car. A 2 in. head clearance permitted travel in daylight only.

MARTIN

PRESENTS THE NEW

FOLDING GOOSENECK TRAILER

TO CARRY



. . . TO LOAD OR UNLOAD

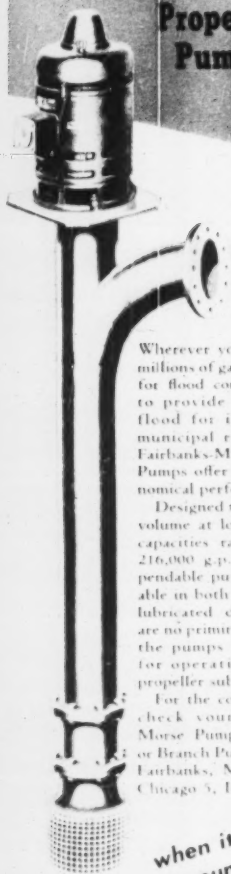
MARTIN CARRYHAUL TRAILERS

MARTIN MACHINE COMPANY
KEWANEE, ILLINOIS — YOUR CATERPILLAR DEALER IS YOUR MARTIN DEALER

Write for complete information and specifications on the new Martin FOLDING GOOSENECK TRAILER

FOR FLOOD CONTROL or FLOODS OF WATER

Fairbanks-Morse Propeller Pumps



Wherever you must move millions of gallons daily . . . for flood control work or to provide a man-made flood for irrigation or municipal requirements, Fairbanks-Morse Propeller Pumps offer efficient, economical performance.

Designed to supply high volume at low head, with capacities ranging up to 216,000 g.p.m., these dependable pumps are available in both water and oil lubricated design. There are no priming delays since the pumps are designed for operation with the propeller submerged.

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(Continued from page 78)

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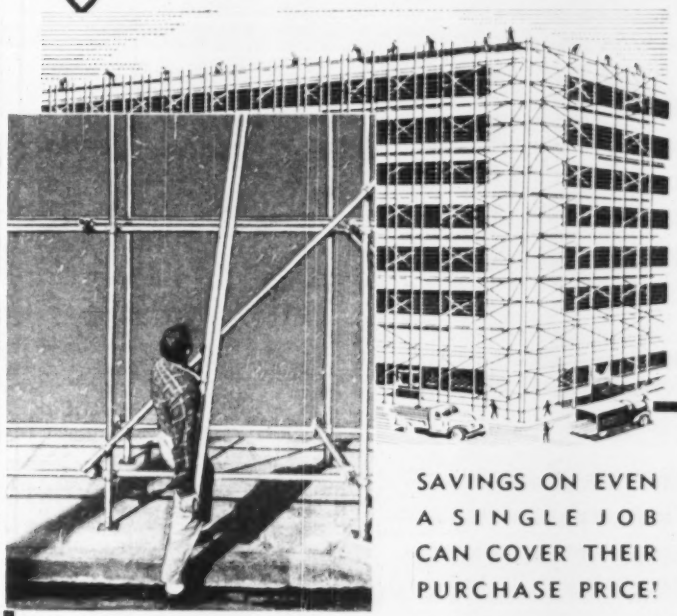
NEW UP-RIGHT *Aluminum Alloy* "*Tube-and-Coupler*" SCAFFOLDS



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BIDS ASKED

† Maine—R.A. About 5/9—U. S. Eng., Army Base, Boston, Zone 10, Mass.; maintenance dredging Port

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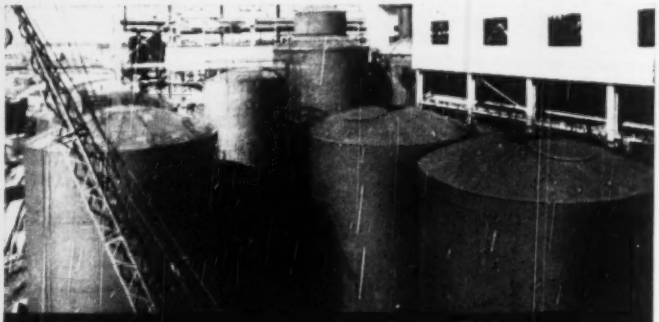

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LOW BIDDERS

▲† California

† Florida

▲† Oregon

CONTRACTS AWARDED

AIRPORTS

LOW BIDDERS

CONTRACTS AWARDED

PUBLIC BUILDINGS

BIDS ASKED

Ont., Toronto (North York)—SCHOOL—B.A. 5/4—A. ward & Gourlay, archts. 2 story brick & concrete block school, 6 rms. & H.R. Ave. the First Two Schools Area of North York & St. Brownlee, Jas. Avenue and Avenue 45. Approx. $250,000. CD 22 15 49.

▲ Conn., Danbury—COLLEGE—B.A. About 5/10—State, Raymond K. Thatcher State Director, Hartford, two wings, auditorium and gymnasium classroom bldg., Teachers College, Seventeen Ave. and Osborne St. $1,000,000. Philip N. Sunderland, Inc., 81 West 55, archts. CD 10/27.

▲ Ky., Oklahoma—SCHOOL—B.A. 5/10—Jefferson Co. Bd. Educ., W. Jefferson St., Louisville, Zone 2, 2 story, reinforcement brick, high school. $1,500,000. Plans deposit $25. Fred Hostetter, Realty Bldg., Louisville, Zone 2, archts. & engrs. Frank & Wilson, 2 S. Third St., Louisville, Zone 2, engrs. CD 4/4, under Ky., Louisville.

Mass., Gloucester—HOUSING—B.A. 5/10—City of Gloucester Housing Auth., Gloucester, 200 unit 2 story veterans housing. Approx. $400,000. Thomas Worcester, Inc., 84 State St., Boston, archt. and engr. CD 7/14.

N. Y. Lynbrook—SCHOOL—B.A. 5/10, 11, Ed.C. Union Free School Dist. 20, Lynbrook High School, Union Ave. school addn., Marion St. and Waverly Ave. $412,000. school addn., Clark Ave. between Sherman and Burton Sts. $205,000. grade and high school alterations, Atlantic and Union Aves. $122,000. Frederick P. Westerman, 240 Rockaway Ave., archt. & engr., Valley Stream.

N. C., Greensboro—HEATING PLANT, etc.—B.A. 5/24—Agricultural & Technical College of North Carolina, F. D. Bluford pres., greenhouse, central heating plant, preparation of site, roads, walks, parking areas, landscaping. Sect. B, power, steam, water, heating, steam, water and other piping, sewer and drainage system in vicinity of Dining Hall, Sect. 10, electrical work in vicinity of Dining Hall, Sect. 12, electrical work in vicinity of Science Hall. Plans deposit $15, each. C. E. Lee, Jr., Engr., Greensboro.

Alta., Ralston—DWELLINGS—B.A. 5/10—Ralston Housing Co., Ltd., Kensington Bldg., Winnipeg, Man., 6 eng. 4 unit, 2 story brick veneer dwellings. $60,000. Plans deposit $10.

N. Y., New York—SCHOOL—B.A. 5/11—Bd. of School Buildings, Dept. of Public Works, Arthur Ave. school, Bronx, Zone 1, 2 story, 192 x 212 ft., 16 class rms., gym, heating and ventilating, auditorium, cafeteria, toilet facilities for junior high school. $1,276,000. Plans deposit $22. Watson Elkins, Municipal Bldg., Manhattan, archt. & engr. Bd. of Education, Plans, Specifications & Estimates, 110 Livingston St., Brooklyn, Zone 1, engrs. Plans deposit $10 each. $7 each set of work drawings. CD 4/4, 11/49.

Calif., Santa Rosa—GYM—B.A. 5/12—Bd. of Trustees, Santa Rosa Junior College, Mendocino Ave. and Sonoma Ave., steel memorial gym, 2 story, 193 x 212 ft., 16 class rms., shops, etc. Approx. $750,000. Plans deposit $50. C. Cowden & Associates, 1 Post St., San Francisco, archts. & engrs. Santa Rosa Junior College, Bursar's Office, Santa Rosa. Plans may be seen at office of Associated General Contractors of San Francisco Bldg., 2 Post St., San Francisco. CD 2/7, under Sonoma Co.

Conn., Hamden—SCHOOL—B.A. 5/12—Bd. of Education, Edgar Memorial Junior High School, Dixwell Ave. and Hill Side Ave., Hamden, 2 story, brick, reinforced concrete, fire resistive construction. $475,000. Plans deposit $100. Henry Kaelin, 282 York St., New Haven, archt. CD 10/24.

▲ Ont., Trenton—HOUSING—B.A. 5/12—A. J. E. Cleaver, Chief Controller of Supply & Services, Dept. of Reconstruction & Supply, Ottawa, 250 dwellings, C. A. F. Trenton, N. S. Approx. $3,100,000. Plans deposit $50.

Calif., Riverside—SCHOOL—B.A. 5/12—City Bd. of Education, Riverside, 2 story, reinforced concrete, high school. $1,000,000. Harold W. Kaiser & Associates, Masonic Temple, Riverside, archts. CD 5/15.

Kan., Mission—SCHOOL—B.A. 5/12—Prairie School Dist. 46, Harold D. Dent, pres., Prairie Public School, 67 and Mission Rd., R. F. D., Kansas City, Kan., supplementary school bldg., 2 stories and basement. $100,000. T. W. Anderson & Co., National Bank of Topeka Bldg., Topeka, archts. CD 4/28, under Kan., Olathe.

Calif., Eureka—HOSPITAL—B.A. 5/12—Humboldt Co. Hospital Dist., Eureka, 32 bed wing, Unit B, hospital, nurses' home, storage, 2 story, reinforced concrete, fireproof construction, etc. Approx. $2,500,000. Plans deposit $250. Bakewell & Brown, 215 Post St., San Francisco, archts. CD 12 16/49.

† N. C., Winston-Salem—ARMORY—B.A. 5/17—U. S. Engr. River & Harbor Bldg., Savannah, Ga., Invitation Serial No. Eng 09-133-50-50. CD 4/12.

Alaska, Petersburg—HIGH SCHOOL—B.A. 5/17—General Services Administration, Community Facilities Service, Region 7, 2 story, 110x160 ft. high school, Petersburg, Alaska. Approx. $500,000. Plans deposit $25. Fred A. Malcolm, Juneau, archts. CD 4/19/47.

Ont., Ottawa—GENERATING UNITS, etc.—B.A. 5/17—Acting Secy. Dept. P. Wks., Hunter Bldg., supply, installation steam generating units and accessory equipment at Central Heating Plant, Cor. St. Approx. $2,000,000. G. Brunet, city owner, archt. CD 12/14.

Ill., Carlinville—HOSPITAL—B.A. 5/18—Carlinville Area Hospital Assn., Jos. Madison, pres., Main St., Carlinville, 3 story, brick & concrete, 100 bed hospital. $500,000. Plans deposit $10. Edwin H. Clark & Associates, 30 E. Lake St., Chicago, 11, Ill., engrs. and archts. CD 4/20/49.

Ont., Camp Borden—HOUSING—B.A. 5/18—J. D. M. Cattle, secy. Canadian Commercial Corp., 70 Lyon St., Ottawa, 250 unit barrack block, Tender No. 0-1-29-1459. Approx. $375,000. Plans deposit $...

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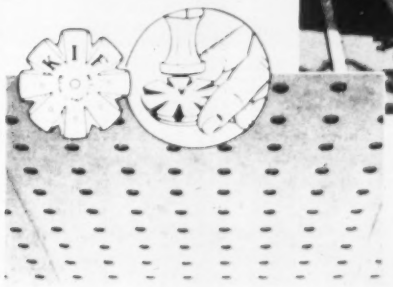

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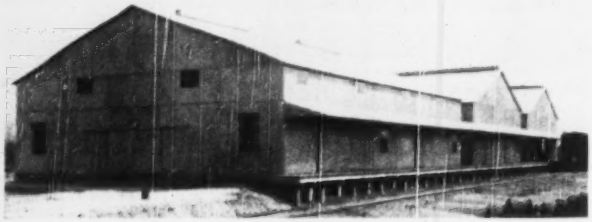

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Hayward Buckets

Use this Class "E" Clam Shell Bucket for handling crushed stone, gravel, sand and other bulk materials

THE HAYWARD CO., 48-50 Church St., N. Y.

La., Lafayette—Contracts—B.A. 6[illegible] State Bd. Educ., Capitol Bldg., Baton Rouge, 2 story, brick chemistry bldg., on campus of Southwestern Louisiana Institute, $750,000. Plans deposit $50, Smith & Padgett, Dickson National Bank Bldg., Monroe, archts. [illegible]

LOW BIDDERS

▲ Calif., Modesto—HIGH SCHOOL—Modesto Bd. Educ., 24 and 1 story, Apr. 17, 1 story, brick [illegible] shops and [illegible] from Geo. Rice, Box 744, Stockton, $1,599,690. Lump sum in bids. CD 3-21.

▲ Calif., Porterville—INSTITUTION—State Dir. Architecture, P. Wks. Bldg., Sacramento, Apr. 28, general [illegible] 1 story, 475,000 sq. ft., state highway [illegible] Box 1317, Porterville, $1,445,682. Heating and gen. [illegible] from Porterville, [illegible] Fresno, $287,723.

▲ Calif., Redwood City—HIGH SCHOOL—Sequoia Union High Sch. Dist., Redwood City, Apr. 14, [illegible] Clark and Arthur Allenson, Mason Park, High [illegible] (Portland) 1 story, [illegible] sq. ft., [illegible] 324 Hooper St., San Francisco, $1,475,000. CD 3-14.

▲ Ill., Urbana—ANIMAL SCIENCE—University of Illinois, Urbana, 6 story steel and concrete [illegible] Bldg., [illegible] Zone 1, $1,062,500. Navy [illegible] N. Y.

▲+ N. M., Las Alamos—HOSPITAL—U. S. Atomic Energy Comm., Apr. 19, 1 story, [illegible] Robert E. Wilson, Santa Fe, $2,261,000. CD 3-13.

N. Y., Whitestone—[illegible] Bridge Plaza, Long Island City, A. Comm., 14 Eighteenth Ave., [illegible] Zone 1, Apr. 14, general contract, [illegible] [illegible] Bridge Plaza, Long Island City, [illegible] Lexington Ave., New York, Zone 17, $943,000.

Pa., Elizabethtown—HOSPITAL—General State Auth., 18 [illegible] Harrisburg, Apr. 19, general contract, [illegible] [illegible] Bureau of Architecture, Harrisburg, [illegible] Berwick, $341,043. CD 3-13.

▲ Pa., Hollidaysburg—[illegible] Auth., Harrisburg, Apr. 14, general [illegible] Zone 22, $1,444,000. CD 3-24.

S. D., Yankton—HOSPITAL—[illegible] Bd. Commrs., [illegible] $253,329. CD 3-23. CD 3-28.

▲ Tenn., Nashville—[illegible] Dept., 51 Edgar Jackson Bldg., Nashville, Apr. 5, general contract, [illegible] Apr. 5, $1,084,022. CD 3-16.

Wash., Kennewick—[illegible] $858,000. CD 3-16.

▲ B. C., Trail—[illegible] Apr. 19, [illegible] $1,154,425. $1,000,000. CD 3-16.

CONTRACTS AWARDED

▲ Calif., Chino—[illegible] Apr. 19, [illegible] $1,735,700. Bids 3-21. CD 4-13. Owner [illegible]

▲ Calif., Redwood City—HOSPITAL—[illegible] Mason Co., [illegible] $1,332,550. Bids 3-21. CD 4-13.

▲ Kan., Great Bend—[illegible] $1,148,878. CD 3-24.

▲ N. Y., Astoria—[illegible] Long Island City, $3,639,000. Bids 3-14. CD 3-16. Owner [illegible]

COMMERCIAL BUILDINGS

BIDS ASKED

O. [illegible] Bids 3-21. CD 3-28.

LOW BIDDERS

Wis., Ripon—[illegible] $353,000. CD 3-16.

Continued on page 86

YOU WANT A TOP QUALITY MIX AT THE VERY LOWEST COST

...Right!

THE NEW SEAMAN MIXER GIVES YOU BOTH

Core samples of SEAMAN-mixed pavements have been tested many times by impartial laboratories. Result: equal in quality to the work of central hot or cold mix plants.

That's because all NEW SEAMAN MIXERS are adjustable in either forward travel or in rotor speed to match exactly every type of soil and aggregate so that the most perfect blending of coarse and fines, the most efficient keying of aggregates and the most uniform distribution of binder is accomplished.

Now—consider cost. Road mixing is acknowledged to be the most economical method. But the SEAMAN does the job at less cost than with any other known equipment. There are good reasons: the remarkably low investment, low operating and maintenance cost, and extraordinarily high hourly output of perfectly blended and mixed materials.

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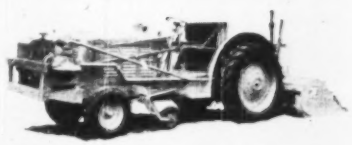
SEAMAN SELF-PROPELLED MIXER

Close-coupled, short turning radius. Standard dual transmission gives 7 forward mixing speeds plus road gear and reverse. Wide visibility. All controls in instant reach. 7 ft. mixing width.

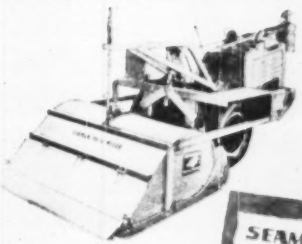
SEAMAN SELF-PROPELLED TRAV-L-PLANT

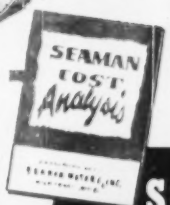
All Self-Propelled advantages plus spray bar, pump, pump tachometer and tachometer wheel for accurate, no-migrating no-evaporating admixture of bitumen or water placed most efficiently just ahead of rotor.



SEAMAN PULL-TYPE MIXER

Here selective speed transmission controls rotor speed instead of forward travel to obtain highest mixing efficiency despite variables in speeds of towing tractors.





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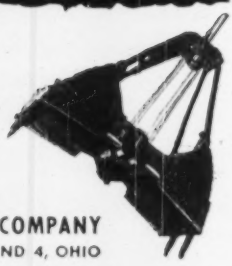

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Continued from page 84

Wis., Wauwatosa CHURCH, etc., St. Anne's Catholic Congregation, Apr. 22, general contract 1 story, 56x130 ft., church and 1 story, burnt, 16x260 ft., school, from Hoffman Constr. Co., Appleton, $281,000. CD 1-24

CONTRACTS AWARDED

Md., Dundalk RESIDENCES—Dundalk Bldg. Co., 910 Court-Square Bldg., Baltimore, two hundred-eighteen 16x28x32 ft. concrete brick residence, Dundalk Village, Dundalk Rd., Dorwood Rd. and Mcshane Way, separate contracts, $961,000.

▲ N. J., Ewing Twp. (Trenton P. O.)—HOMES—Fire-rate Homes, Inc., Raymond Boulevard, prog., 600 Homes, new Ave., Trenton, and houses, Tower Building, $2,183,000. Johnson Jones, Chamber Bldg., New York, N. Y., architects and engrs. Trenton Engr. Co., 243 E. State St., Trenton, engr.

▲ N. Y., Hempstead APARTMENT—First Army Division Housing Board, Construct, manage and finance 420 family garden apartment proj., on Merrick Rd. on 42 acre site at Mitchell Field, to Cropsey Constr. Corp., Alexander M. Cruz, 1765 Grand St., New York, Zone 2, $5,000,000. Johnson Building Corp., 1 Tower Place, Zone 4, Farmingdale, L. I., Brooklyn, Zone 2, archts. and engrs.

R. I., Warwick CHURCH, etc.—St. Mark's Episcopal Parish, c/o A. K. Pomeroy, Arch., Bacon Bldg., Providence, 1 story, brick, Gothic, Burnt, 55x140 ft., church, 1 story, brick, 30x60 ft., parish house, and 1 story, brick, 20x30 ft., rectory, W. Shore Rd., to Dixon Constr. Co., Inc., 296 Hope St., Bristol. Approx. $250,000. CD 1-10

INDUSTRIAL BUILDINGS

BIDS ASKED

O., Toledo FREIGHT TERMINAL—B.A. Approx. $1,5[illegible]

Md., Sparrows Point WAREHOUSE—Bethlehem Steel Co., [illegible]

Ont., Toronto FACTORY—N. A. Armstrong, Limited, [illegible]

SOON LETS CONTRACT

La., Baton Rouge [illegible]

Ont., Hamilton PLANT—[illegible]

CONTRACTS AWARDED

Neb., Omaha [illegible]

N. Y., New York [illegible]

[illegible] Ave., Zone 27. Approx. $400,000. CD 1-17

O., Dayton [illegible] Approx. $200,000. Architect [illegible]

Ont., Toronto FACTORY—Canada Packers, Ltd., [illegible]

Ont., Toronto PLANT—Simpson Manufacturing Co., Ltd., [illegible]

UNCLASSIFIED

BIDS ASKED

† Va., St. Juliens Creek SPRINKLER SYSTEM—B.A. [illegible]

Pa., West Chester [illegible]

† Arizona-California-Nevada [illegible]

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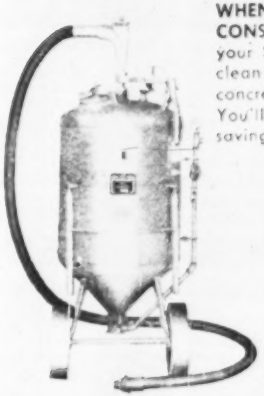

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Ark., Pocahontas—City, A. L. Wright, mayor, sanitary sewer extens., sewage treatment plant. Ark. Eng. Co., Little Rock, consult. engr. $227,702.

Calif., Menlo Park—Menlo Park Sanitary Dist., Menlo Park, voted $980,000 bonds, sewage disposal plant.

Conn., Deep River—Town Bd. of Selectmen, Town Hall, sewerage system, sewer mains, trunk lines, facilities. $150,000.

Conn., Hartford—Metropolitan Dist. Comm., P. Wks. Dir., Bd. Contract & Supply, 115 Broad St., sanitary sewers, Albany Ave., for sewage treatment. $100,000.

▲ Ill., East St. Louis—City, John T. Connors, mayor, City Hall, Main St. at Missouri Ave., voted $2,500,000 bonds, relief storm and sanitary sewers in various locations; Howard A. Johnson, Star Bldg., 1221 Locust St., St. Louis, Mo., engr. (CD 4-19)

Mass., Webster—Town, sewer bldg. program, sewage disposal plant, treatment, facilities. $350,000; supplies, etc., $250,000—A. Lawrence Rotch & Fox, 89 Broad St., Boston, consult. engr.

Mo., Farmington—City, City clerk, sewerage sys. improvs. and enlargement, including sewage treatment plant, etc. $250,000—A. Lawrence Rotch & Fox, 89 Broad St., Boston, consult. engr.

▲ Mo., University City, St. Louis P. O.—City, Thomas F. Maer, engr., City Hall, 6801 Delmar Blvd., storm water sewers in Rock Creek sewer area. $2,400,000. Horner & Shifrin, Star Bldg., 1221 Locust St., St. Louis, consult. engrs.

▲ O., Cincinnati—City, City Hall, and Alfred St., Inc., Cincinnati, sewerage system, sanitary sewers, paving, sewer pt., $1,875,000. The Supreme Court declared bonds voted November, 1949, unconstitutional, preventing sale of these bonds before the effective date of State Legislative removed requirement from every city in the state. (CD 10-27-49)

Okla., Bethany—City, S. P. Dawson, mayor, Bethany, storm sewers, sewer mains and line to extend disposal plant on S. Canadian River. $125,259. Layne-Western Co., 1400 W. Main St., Oklahoma City, engrs.

Okla., Lawton—City, R. L. Gerlach, engr., Lawton, enlarge sewage treatment plant. $617,000. Wyatt B. Hamilton, City Hall, consult. engr.

S. C., Union—City, bond election June 6, sanitary sewer mains. $558,000.

Tenn., Springfield—City, sanitary sewer projects. $580,000.

Tex., Lamarque—Lamarque Co. Water Control & Improvement Dist. No. 1, Lamarque, sewage treatment plant. $211,000. Joe J. Rodd, 611 American Life Bldg., Fort Worth, engr. (CD 2-19-48)

Tex., San Antonio—Browning Jr. Insurance Bldg., contract owner, $60,000; storm sewers and drainage, $50,000; et al.

Wash., Raymond—City, sewerage treatment plant and intercepting sewers, $256,300. R. W. Gray, Corbett Bldg., Portland, Ore., consult. engr.; F. E. Clark, city engr.

BRIDGES

Wash., Bellingham—Whatcom Co., County Courthouse, contract awarded to Lynn Construction Co., Bellingham, for bridge over Nooksack River at Ferndale, $75,000. R. H. Baldock, engr.

Alta., Edmonton—[illegible] $100,000.

Alta., Edmonton—[illegible] $150,000.

STREETS AND ROADS

Ill., Cornell—Assly. Twp. Road Dist., Comm., voted $100,000 bonds.

▲ La., Bastrop—[illegible] $1,066,850.

La., Houma—[illegible] $613,000.

N. Y., New York—Port of New York Auth., 111 8 Ave., [illegible] Parkway, $9,000,000.

N. C., Goldsboro—[illegible] $150,000.

▲ Pennsylvania—[illegible] $12,000,000.

▲ Tenn., Nashville—[illegible] $5,000,000-$8,000,000.

Tex., Colorado City—[illegible] $100,000.

Va., Richmond—[illegible] $78,000.

B. C., Prince George—City, City Hall, hard surf. streets and sidewalks in downtown area. $100,000.

AIRPORTS

Tex., Amarillo—TERMINAL—City plans by Emmett F. & James F. Pittenger, 1000 Fox Bldg., terminal or administration, $400,000. (CD 2-8-50)

+ Tex., Dallas—RADAR STATION—U. S. Dept. Air Corps, Perkins Bldg., Wash. 25, D. C., radar station, $225,000.

Tex., Snyder—AIRPORT—Scurry Co., Snyder, airport, $300,000. Air Weather Eng. Co., Odessa, consult. engr. (CD 4-19)

LATIN AMERICA

Ecuador, Quito—Republic of Ecuador, Quito, plans plant for rewinding, threading and writing paper, $1,780,000.

El Salvador, San Salvador—Republic of El Salvador, San Salvador, [illegible] 5,000 watt short wave, $260,000.

Mexico, Ciudad del Carmen—[illegible] Comercial de Concreto S. A., Calle 22, No. 107, Ciudad del Carmen, [illegible] and vegetable products refrigeration plant, $200,000.

Mexico, Ciudad del Carmen—[illegible] Mexicana S. A., Calle 22, No. 107, Ciudad del Carmen, Campeche, [illegible] and vegetable products refrigeration plant, $200,000.

Mexico, Ciudad del Carmen—Manzanillo del Carmen S. A., [illegible] and vegetable products refrigeration plant, $200,000.

Mexico, Guadalajara—[illegible] $1,500,000.

Panama, Panama City—[illegible] $300,000.

Trinidad, Port of Spain—[illegible] $20,000,000.

PUBLIC BUILDINGS

Calif., Monrovia—CITY HALL, etc.—City Council, deferred $487,000 bonds [illegible] Ave., concrete—(CD 3-16)

Calif., Montebello—CITY HALL—City Council, [illegible] $400,000.

▲ Conn., Hartford—[illegible] $5,700,000.

▲ Ill., Peoria—[illegible] $1,049,000.

▲ Ill., Springfield—[illegible] $1,610,000.

▲ Mass., Boston—[illegible] $1,600,000.

Mass., Cambridge—[illegible] $525,000.

Mass., Clinton—[illegible] $950,000.

▲ Mass., Worcester—[illegible] Development, Approx. $5,000,000.

N. Y., Brooklyn—GRAIN TERMINAL—Seaboard Port Auth., New York, Zone 11, rehabilitation [illegible] $564,600.

O., Avon Lake—[illegible] $325,000.

O., Granville—[illegible] $465,000.

O., Huron—[illegible] $430,000.

O., North Royalton—[illegible] $425,000.

O., South Euclid and Lyndhurst—[illegible] $450,000.

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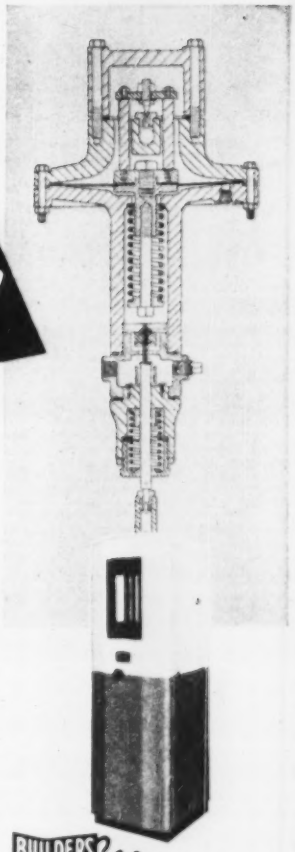

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▲ Conn. New Haven . . . $2,000,000

▲ Ill. Evanston . . . $1,430,000

▲ Ill. Franklin Park . . . $1,000,000

▲ Ind. South Bend . . . $1,150,000

▲ Ky. Louisville . . . $750,000

▲ Mo. Fort Kent . . . $2,000,000

▲ N. Y. Auburn . . . $500,000

▲ N. Y. Auburndale . . . $250,000

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▲ N. Y., Brooklyn—APARTMENT—Fundamental Building Corp., 215 Montague St., Zone 2, plans by Simon W. Zelnik Assoc., 115 E. 82 St., New York, Zone 17, 3 six-story apartments, 367-73 and 388-94 Avenue S, $1,220,000.

N. Y., New York—APARTMENT—Ellwood Gardens, 3 Park Row, plans by Gustave W. Iher, 104 E. 25 St., Zone 10, 6 story apartment, 31-37 Nagle Ave. and 194 Sherman Pl., $750,000.

N. Y., Whitestone—APARTMENTS—Soundview Building Corp., c/o Sol Simon & Sonsky, 4 Court Square, Brooklyn, Zone 2, 2 story apartments, Parsons Blvd., between 28 and 29 Aves., $360,000; 2 story apartment, 26 Ave. and 14th St., $224,000.

▲ O., Cleveland—HOSPITAL—Euclid-Glenville Hospital Proj. Assn., c/o Jerome V. Sasner, 21611 Lakeshore Blvd., Euclid, 6 story brick, block steel framed addition to Hospital, E. 105 St. and Lake Erie, $3,000,000.

Pa., Mt. Lebanon—APARTMENT—Lebanon Vue Apartments, Inc., 666 Washington Rd., Mt. Lebanon Municipal Bldg., Zone 15, 3 story by William Frederick, 121 E. Newlin Ave., Pittsburgh 6, 6 story, stone, 36 x 178 ft., apartment, 420 Cochran Rd., $750,000.

Tex., Dallas—DWELLINGS—S. Empire, 8318 San Fernando St., J. W. Bellamy, Empire Bldg., and C. Development Co., Inc., Box 4245, all A. and E. Barnett, 4215 Parker St., 117 frame dwellings, Easton Rd. area, $475,000.

▲ Tex., Dallas—STORES—Safeway Stores, Inc., 1924 Herman St., masonry retail stores, 10 separately unit, Store 1, $250,000; Store 2, $275,000; Store 3, $300,000; Store 4, $250,000; Store 5, $215,000; Store 6, $265,000.

Tex., Fort Worth—DUPLEXES—Benefield Acceptance, Inc., c/o Charles Hawk, Wilco Insurance Bldg., plans by Joe Ed Tressler, 1st Nat'l. Bank Bldg., and Preston Byers, 2342 Ft. Worth Ave., $487,500. Carter & Burgess, A-E Carter & Burgess Bldg., consult. engrs.

Tex., Houston—RESIDENCES—S. L. G. Norman Building Corp., 1315 Richmond Rd., residential area, 73 dwellings, $500,000.

▲ Tex., Houston—COMMERCIAL—A. E. Olson Bldg., 2102 Travis St., plans by Joseph Finger, 1216 Texas Ave., 4 story, 100 x 100 ft. masonry, Commerce area, $400,000; 14 story, 52 ft. masonry, Commerce area, $400,000, both on Fannin St. at Gray, Caldwell Zone.

▲ Utah, Salt Lake City—HOUSING—Housing Authority of Salt Lake City, 1 story brick veneer masonry dwellings, [illegible] Ave. and 1700 S. St., $1,234,000.

▲ Va., Arlington—DEPARTMENT STORE—The Hecht Co., Washington, D. C., 1 story, 1,000,000 sq. ft. department store, Cedar Rd. and Wilson Blvd., parking facilities for 2,000 cars, $6,000,000, incl. land and equip.

Wash., Moses Lake—HOUSING—R. Fantenes & Earle Amick, Moses Lake, plans by J. J. Wanek, 1263 E. 63 St., Seattle, Zone 5, 5,000 houses, $900,000.

Wis., Milwaukee—APARTMENTS—Kasten, 4931 W. State St., owner & architect, 2 story, 2 story apartments, $750,000—$1,000,000. Project valuation, CD 2-27.

B. C., Victoria—OFFICES—British Columbia Electric Co., Victoria, structure to accommodate administration offices at central location, $500,000.

▲ Ont., Ottawa—HOUSING—Clabar Realty Co., 116 A. J. Austin Bldg., plans by Austin & Pratt, 1 South Side Market, 2 story, Avenue A, $1,000,000.

Que., Ville St. Michel—Postal District, Montreal—Canadian Government, c/o Dept. of Public Works, J. J. Ahern, city hall, 22 dwellings, $400,000.

INDUSTRIAL BUILDINGS

Ia., Bondurant—GRAIN ELEVATOR—Farmers Elevator Co., Bondurant, grain elevator, $326,000.

Ky., Louisville—PLANT—National Carbide Co., Bells Lane, soil reduction plant, $500,000.

Pa., Phila.—WAREHOUSE—B. F. Goodrich Co., 3rd & C Mass. St., Avens, Inc., warehouse and office, $400,000. Lyle M. Avens, engr.

Pa., Pittsburgh—WAREHOUSE—South Side Transfer & Storage Co., S. 7 St. & S. Brady St., plans by Charles Roberts, East Center Ave., 1 story, 1 basement, brick, steel construction, 28 and A. V. R. R., $350,000.

Tex., Orange—WAREHOUSE—Burton-Lingo Co., building materials warehouse, $750,000.

▲ Tex., Rusk—PLANT—Valley Iron & Chemical Corp., 1 to 2 story expansion, $1,250,000.

▲ Philippine Islands, Manila—PLANT—Philippine Chemical Corp., Manila, plant country superphosphate, $3,000,000.

UNCLASSIFIED

Ariz., Phoenix—AERIAL TRAMWAY, etc.—Charles H. Arnason & Associates, 112 W. Jefferson, and Frank Lloyd Wright, Taliesin, Spring Green, Wis., 2 passenger tramway and reconstruction at base and crest of mt., $700,000.

Arkansas—GAS DISTRIBUTION SYSTEM—Arkansas Western Gas Co., Fayetteville, gas distribution system, construction and connecting line from Prairie Grove to Lincoln, $100,000.

Calif., Montebello—TRAFFIC SIGNALS, etc.—City Council, defeated bonds, traffic signals, $50,000; stadium, $175,000. John L. Cole, city engr. (Correction-status) CD 2-27.

Georgia—RURAL DISTRIBUTION LINE, etc.—Lamar Electric Membership Corp., Barnesville, 100 mi. rural distr. lines and sys. improvs., Lamar Co., $145,000.

Iowa—RURAL DISTRIBUTION LINES—Plymouth Electric Cooperative Assn., LeMars, rural distr. lines, syst. improvs., Plymouth Co., $223,000. Brown Eng. Co., 320 K. P. Bldg., Des Moines, engr. CD 8-23-49.

Oregon—FISH HATCHERY—State Fish and Game Commission Bldg., Portland, fish hatchery on Sandy R. near Sandy, Multnomah Co., $240,000. Arnie J. Soumela, c/o owner, engr.

Tenn., South Fulton—GAS SYSTEM—City, natural gas sys., $140,000.

▲ Texas and New York—RADIO COMMUNICATION SYSTEM—Transcontinental Gas Pipe Line Corp., oil and gas bldg., Houston, radio communication system between Mercedes, Tex. & New York, for 10,000 mi. system between Texas and New York, $2,000,000. CD 1-12.

Texas—RURAL DISTRIBUTION LINES—Midwest Electric Cooperative, Bldg. 105, Love Field, Dallas, rural distr. lines, 29 mi. line, sub. improvs., Foster Co., $293,000. CD 9-11-46.

Tex., Alice—SYSTEM—Jim Wells County Levee Improvement Dist., Courthouse, relief bonds, flood control and exhibit units, $300,000. CD 3-23-50.

▲ Tex., Orange—PORT REHABILITATION, etc.—Port Commission, Orange, $750,000; new wharves, $500,000. CD 4-27-50.

Tex., Tyler—TELEPHONE SERVICE LINE—Southwestern Bell Telephone Co., Tyler, telephone service line, exch. facilities and equip., $343,000.

Vermont—RURAL DISTRIBUTION LINES—Washington Electric Cooperative, Barre, 69 mi. rural distr. lines and sys. improvs., Washington Co., $187,000.

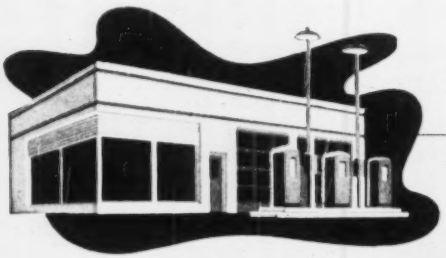
Wash., Tacoma—THEATER—L. C. Newman, Northwest Theatre Circuit, 1 story, 1,000 seat theatre, Proctor St., $400,000.

Alta., Edmonton—GARAGE, WORKS—Municipality, $100,000. J. G. A. Motors Co., plans by engr.

Ont., Alexandria—APPLSA—Municipality, arena, curling rink, swimming pool, etc., $100,000.

Ont., Ottawa—TELEVISION BUILDING, etc.—Canadian Broadcasting Corp., 12 A St., Commerce St. W., Montreal, television bldg. and transmitter station, $650,000.

Que., Three Rivers—HOUSING—Rural Rehabilitation Administration, Montreal, [illegible] $125,000.



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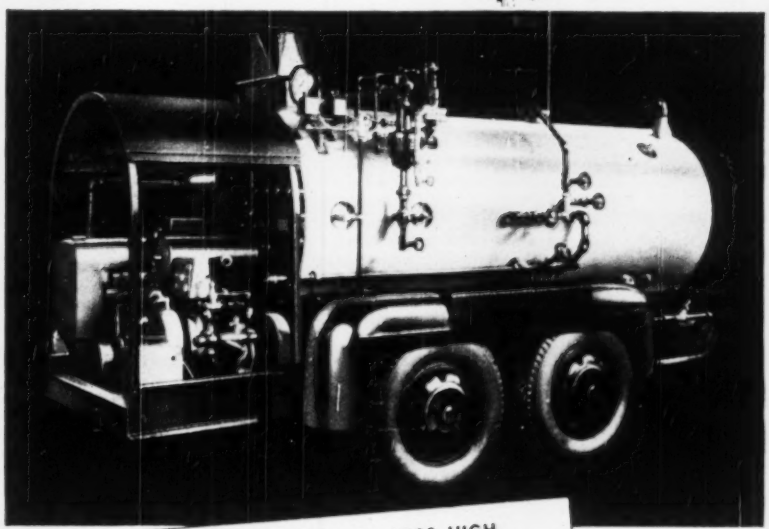

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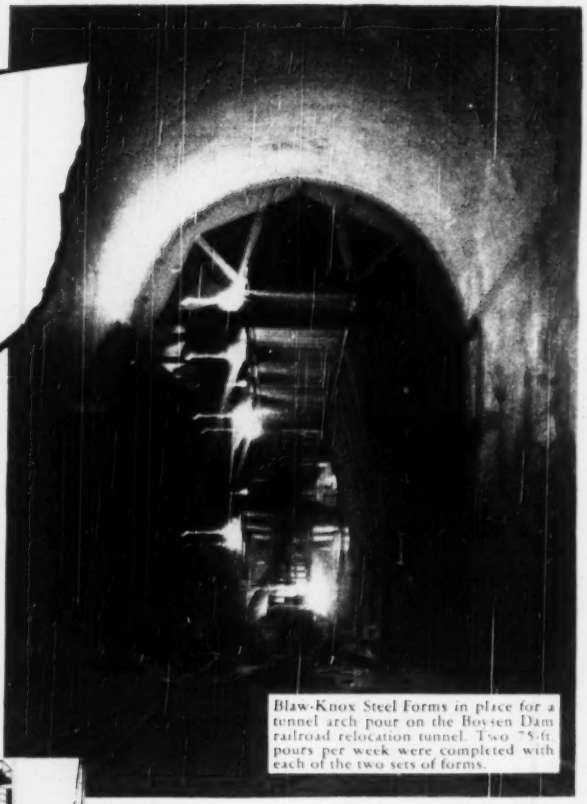
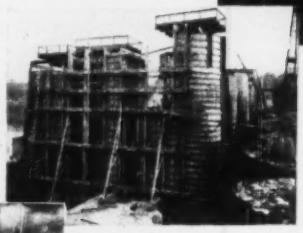
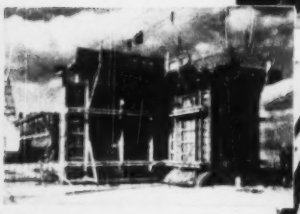
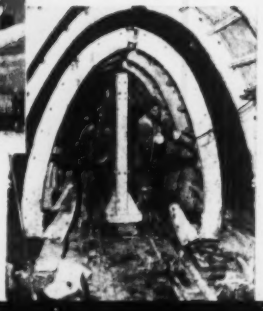


Blaw-Knox Steel Forms in place for a tunnel arch pour on the Boysen Dam railroad relocation tunnel. Two 75-ft. pours per week were completed with each of the two sets of forms.

Blaw-Knox Steel Forms handle a wide variety of jobs. Here Blaw-Knox Pier Forms are used during construction of the Emsworth Locks at Pittsburgh, Pa.







Above, Sewage disposal plant for Chicago's southwest side was constructed with Blaw-Knox Steel Forms.

At right, Blaw-Knox telescopic Steel Forms set to pour 96" sewer at Fort Wayne, Ind.

WHATEVER your concreting problems, you'll get the job done faster and well within your estimate when you combine the time saving efficiency of Blaw-Knox Steel Forms with the money-saving recommendations of Blaw-Knox engineering service. This consultation service is available to any contractor, from the blueprint stage to the final pour. Blaw-Knox engineers help you select the forms just right for the job, work with you in planning for simplified forming methods that often reduce the number of operations necessary, speed the job, and keep costs at minimum levels. The experience gained over 40 years by the original and most prominent manufacturer of Steel Forms for heavy construction is at your service. Write today for advice and information on your concreting problems. Ask for Bulletin 2035.

BLAW-KNOX

BLAW-KNOX DIVISION OF BLAW-KNOX CO., Farmers Bank Bldg., Pittsburgh 22, Pa.

New York • Chicago • Philadelphia • Birmingham • Washington

CONSTRUCTION REPORTS-Second Section

WATER SUPPLY

BIDS ASKED

B.C., Prince Rupert—B.A. 5/8—H.D. Thain, city purch. agt., City Hall, supplying ca. pipe valves, fittings, incl. ab. 4,200 ft. 6-in. cl. c.i. pipe, Class D; 15 hydrants, sleeve-outlet type with hub connection; 35 gate valves with hub ends for ca. pipe; 6 tees, 6 sts., hub and flg. cl. pipe; 2 crosses, 6-in. hub and flg. cl. pipe; 3 bends, 45 degrees with hub ends for c.i. pipe.

Md., Towson—B.A. 5/4—Comm., Baltimore Co. Court House, Govt. 213 O. & W. approx. (water) 8,240 lin. ft. of 12- to 4-in. c.i. pipe; appurtenances; 257 meter vaults, single setting, 14 meter vaults, two setting, 3,540 lin. ft. of house connections, 1-in. to 2-in.; 2 house connections, sanitary sewers, 1,110 lin. ft. 8-in. and 6-in. cast iron pipe; 55 excavation trench, 8,750 lin. ft. 15- to 42-in. reinforced concrete pipe, 2,730 lin. ft. 15- to 42-in. reinforced pipe; 2,240 lin. ft. corrugated metal pipe, 164 lin. ft. CMP; appurtenances, etc. Contr. 204 O. S. & W. (A) (water) 37,032 lin. ft. 12- to 16-in. c.i. pipe; 649 lin. ft. 8- and 16-in. R.C. pipe for sewers; appurtenances, etc. Bids opened 4/28. Spec. W-12. C. c.i. pipe fittings, valves, fire hydrants, etc. (C) 1,211 lin. ft. 12- to 30-in. reinforced concrete pipe sewers, manholes, etc., Plans deposit $5, each unit. H. Nelson Cook, House Co. engr. CD 2/26/44.

† Washington—B.A. About 5/11—U. S. Eng., 4735 E. Marginal Way, Seattle, Const. & water supply and treatment plant, Mud Mountain Dam near Enumclaw. Serial No. CIVENG-50-100.50-67.

Va., Gate City—B.A. 5/12—Water City Sanitary Dist., Scott County, P. Huddleston, Dist. Pres. (Box 4, Div. 1, 19 mi. E. to Bristol, Tenn.) water supply, Div. 2, 7 mi. W. to Rose Hill, water supply, Div. 3, 4 mi. W. to Ewing, water supply, Div. 4, 4 mi. W. to Fort Blackmore, water supply, Div. 5, 4 mi. W. to Va.-Ky. line, water supply, Div. 6, 4 mi. W. to Va.-Ky. line, water supply, Div. 7, 4 mi. W. to Va.-Ky. line, water supply, Div. 8, 4 mi. W. to Va.-Ky. line, water supply, Div.

deposit $15. Wiley & Wilson, 905 Peoples Bank Bldg., consult engrs.

B. C., Vancouver—DWELLINGS—B.A. 5/9—J. L. Adams, regional construction engineer, Central Mortgage & Housing Corp., 360 Homer St., 113 frame dwellings. Approx $650,000. Plans deposit $25. CD 11/19/47.

Kan., Hugoton—COURTHOUSE—B. A. 5/10—Stevens Co. Hugoton courthouse, $375,000. Mann & Co., Hutchinson, archts. CD 3-31.

Ill., Alton—SCHOOL—B.A. 5/10—Alton Community Consolidated Sch. Dist. 11, of Madison Co., H. Edward Zeller, sec., Bd. Educ., Hawell House, 1211 Henry St., P.W. Site West Junior School. $500,000. Plans deposit $30. Albert M. Goedde, 1452 State St., East St. Louis, archt. CD 10/4/49.

N. Y., Cortland—PHYSICAL EDUCATION, etc.—B.A. 5/10—Bureau Contracts & Accounts, Albany, physical education and health bldg. at State Teachers College, $712,950. Plans deposit $30. CD 9/24/49.

▲ N. Y., Dannemora—BUILDINGS—B.A. 5/10—Bureau Contracts & Accounts, Albany, Mess Hall and Ward bldg. #6, at Clinton(ville) State Hospital. $2,000,000. Plans deposit $30. CD 4/20/49.

▲ N. Y., Poughkeepsie—HOUSING—B.A. 5/10—Poughkeepsie Housing Auth., 24-1/2 Cannon St. Housing, Multi- and Split Front Turnpike. $3,900,000. Holtz & Dreyer, 44 Market St., archts. CD 8/25.

N. C., Durham—COURTHOUSE—B.A. 5/10—Bd. Comrs., Durham Co., E. S. Swindell, Jr., mgr., Durham, 4 story courthouse addn., alterations. Plans deposit $25. George F. Hackney & Charles F. Knott, Durham, archts. CD 4-25.

O., Cleveland—SCHOOLS—B.A. 5/10—Bd. Educ. 1380 E. 6 St., Brick Valley View School. Plans deposit $10. Arthur Barr, c/o owner, city archt. CD 2/8.

B. C., Chilliwack—HOUSING—B. A. 5/10—J. E. Mc-Cartha, Secy., Canadian Commercial Corp., 70 Wellington St., Ottawa, Ont., 250-man barrack block at Army Camp. Approx $300,000. G. Brandt, Dpt. P. Wks., Hunter Bldg., Ottawa, Ont., archt.

Ont., Ottawa—STATISTICS—B.A. 5/10—Acting Secy., Dpt. P. Wks., Hunter Bldg., Ottawa, installation and completion of excavation, backfill, foundations and footings for Dominion Bureau of Statistics Bldg., Tunney's Pasture Development. Approx $750,000. Plans deposit $75. Owner, archt. CD 3-3.

Ky., Hopkinsville—HOSPITAL—B.A. 5/11—B. H. Lowry, Dir. Tax, Purchases, 230 State Office Bldg., Frankfort, Negro Ward bldg., incl. women's ward, men's ward, dining and administration bldgs., Western State Hospital. Request No. 5-1784. Plans deposit $50. Lawrence Casner, Madisonville, archt. J. B. Rowlett, Dir. Eng., State Office Bldg., Frankfort, engr. CD 3/9.

† Washington—BUILDINGS, etc.—B.A. 5/11, Bureau Reclamation, Dpt. Interior, Laundry, residences, garages, sewer and water distr. sys. pending, not for I&M Headquarters, Minor Class, Columbia Basin Project, Wash. RI-CB-61. Region 1, L. N. McClellan Bldg., P.A. Denver Federal Center, Denver. CD 4-28.

Minn., Red Wing—HOUSING—B.A. 5/11—State Dpt. Administration, P. O. Box 1906, Minneapolis, 50 dwellings, State Training School. $426,000. R. D. Edwards, 510 E. First Natl. Bank Bldg., St. Paul, archt. CD 3/14.

O., Mt. Cory—SCHOOL—B.A. 5/11—Bd. Educ., Bluffton, Ohio, Mt. Cory Rural High School addn. Plans deposit $10. A. M. Strausbaugh, Bluffton, archt.

Wis., Madison—HOSPITAL—B.A. 5/11—State Dpt. Administration, P. O. Box 1906, Minneapolis, 50-bed addn. to Veterans Administration Hospital. Plans deposit $10. Edwards & Daniels, 510 E. First Natl. Bank Bldg., St. Paul, archts.

Ala., Hamilton—HOSPITAL—B.A. About 5/15—Marion Co. Commission, Charles H. Ackerman, Secy., Hamilton, 50-bed addn. to hospital. $140,000. C. B. Hill, Birmingham, archt.

Ala., Leighton—HIGH SCHOOL—B.A. About 5/15—Colbert Co., Bd. High school, $350,000. Hoover & Jr., Sheffield, archts.

† N. M., El Vado—TRAINING CAMP—1210 B.A. 1210 E. 3 Main St., Farmington, 2 dormitories, 2 quarters, 1 mess hall, 1 recreation bldg., 1 infirmary, 1 warehouse, 1 garage, 1 fire station, 1 guard house, 1 administration bldg., 1 classroom bldg., 1 gymnasium, 1 post exchange, 1 bakery, 1 laundry, 1 sewage disposal plant, 1 water supply system, 1 electric power distribution system, 1 heating system, 1 refrigeration plant, 1 telephone system, 1 fire alarm system, 1 sewage collection system, 1 water distribution

OFFICIAL PROPOSALS

RATE: THE RATE FOR OFFICIAL PROPOSAL ADVERTISING IS $1.00 PER LINE (OR FRACTION) PER INSERTION

COPY RECEIVED UP TO 10:00 A. M. FRIDAY FOR ISSUE OUT NEXT THURSDAY SUBJECT TO SPACE OPEN FOR LAST MINUTE ADS

SEND COPY TO OFFICIAL PROPOSAL DIVISION, ENGINEERING NEWS-RECORD, 330 W. 42ND ST., NEW YORK 18, N. Y.

Bids: May 17, 1950 (7225)

Maintenance Building

PENNSYLVANIA TURNPIKE COMMISSION

Harrisburg, Pennsylvania

NOTICE TO BIDDERS

Sealed proposals will be received by the Pennsylvania Turnpike Commission, through the Chairman, 31 North Fourth Street, Harrisburg, Pennsylvania, until 2:00 P.M. (Eastern Daylight Saving Time) the 17th day of May, 1950, and immediately thereafter will be taken to the Public Utility Commission's Hearing Room No. 1, North wing, State Capitol, Harrisburg, Pennsylvania, and publicly opened and read aloud for the following contract and/or contracts:

For the construction of the Maintenance Building at the location listed below.

Contract No.	Maintenance Building No.	Station	County
228	1	240+50	York
239	2	52+00	Lancaster
240	2	122+00	Lancaster
241	3	52+00	Chester

The work to be performed under the contract consists of the construction of the Maintenance Building, paved areas, road, concrete sidewalks, etc., at points on the Turnpike listed above, and including however, the plumbing, the heating systems, the electrical work on the wiring and soldering except as noted in the specifications or as shown on the Contract Drawings.

Copies of plans, specifications and other contract documents may be seen and open to public inspection at the offices of the Pennsylvania Turnpike Commission located at Harrisburg, Pennsylvania, on 2 May 1950. Plans, specifications and other contract documents will not be available before this date for inspection or for making bidders' proposals. Applications for bidding blanks, prints and duplicates may be purchased from the Pennsylvania Turnpike Commission for the sum of $5.00 (Five dollars) per copy.

Plans and specifications may be obtained from the Commission upon deposit of ten ($10.00) dollars for each set, such deposits to be refunded to bona fide bidders submitting bona fide proposals in good condition within ten (10) days after the date of the opening of the bids. Refund will be made for all plans and specifications returned by the prospective bidder not later than the date fixed for the opening of bids. Refunds will be made to bidders only. Refunds will not be made to subcontractors, material men or others who may obtain copies of the plans and specifications from bidders or otherwise.

The Pennsylvania Turnpike Commission reserves the right to award each contract to a reputable contractor of its own choosing from all bids received.

The successful bidder will be required to furnish a satisfactory performance bond in the amount of the contract.

The Pennsylvania Turnpike Commission reserves the right to waive any informality in any bid or to reject any or all bids.

PENNSYLVANIA TURNPIKE COMMISSION
James E. Furlong
Secretary and Treasurer

Harrisburg, Pennsylvania
April 25, 1950

Bids: May 17, 1950 (7161)

Plumbing Systems

PENNSYLVANIA TURNPIKE COMMISSION

Harrisburg, Pennsylvania

Sealed proposals will be received by the Pennsylvania Turnpike Commission, through the Chairman, 31 North Fourth Street, Harrisburg, Pennsylvania, until 2:00 P.M. (Eastern Daylight Saving Time) the 17th day of May 1950, and immediately thereafter will be taken to the Public Utility Commission's Hearing Room No. 1, North wing, State Capitol, Harrisburg, Pennsylvania, and publicly opened and read aloud for the following contract and/or contracts:

For the construction of Plumbing Systems for the following four (4) Maintenance Buildings on the Pennsylvania Turnpike as follows:

Contract No.	Maintenance Building No.	Station	County
228A	1	240+50	York
239A	2	52+00	Lancaster
240A	2	122+00	Lancaster
241A	3	52+00	Chester

The work to be performed under this contract is generally in and around the Maintenance Building above mentioned and consisted of: The work does not include the Electrical System, the Heating System or building construction except as noted in the specifications or as shown on the Contract Drawings.

Copies of plans and specifications and other contract documents, including Reference Drawings, will be on file and open to public inspection at the offices of the Pennsylvania Turnpike Commission located at Harrisburg, Pennsylvania, on 2 May 1950. Plans, specifications and other contract documents will not be available before this date for inspection or for making bidders' proposals. Applications for bidding blanks, prints and duplicates may be purchased from the Pennsylvania Turnpike Commission for the sum of Five ($5.00) dollars per copy.

Plans and specifications may be obtained from the Commission upon deposit of ten ($10.00) dollars for each set, such deposits to be refunded to bona fide bidders submitting bona fide proposals in good condition within ten (10) days after the date of the opening of the bids. Refund will be made for all plans and specifications returned by the prospective bidder not later than the date fixed for the opening of bids. Refunds will be made to bidders only. Refunds will not be made to subcontractors, material men or others who may obtain copies of the plans and specifications from bidders or otherwise.

The Pennsylvania Turnpike Commission reserves the right to award each contract to a reputable contractor of its own choosing from all bids received.

The successful bidder will be required to furnish a satisfactory performance bond in the amount of the contract.

The Pennsylvania Turnpike Commission reserves the right to waive any informality in any bid or to reject any or all bids.

PENNSYLVANIA TURNPIKE COMMISSION
James E. Furlong
Secretary and Treasurer

Harrisburg, Pennsylvania
April 25, 1950

(Continued on page 98)

OFFICIAL PROPOSALS

U. S. Government
(Continued from page 95)

Notice to Contractors

GENERAL SERVICES ADMINISTRATION
Community Facilities Service
Washington 25, D. C.

Sealed proposals will be received by Rufe B. Newman, Jr., Deputy Commissioner for Engineering and Construction, Community Facilities Service, General Services Administration, Room 3143, General Services Building, Washington, D. C., until 11:30 o'clock A.M. Eastern Standard Time, on May 15, 1950, for the construction of the following work at Charlotte Amalie, St. Thomas, Virgin Islands, comprising approximately the following quantities in the major items:

PROJECT NO. 53-105—WATERFRONT IMPROVEMENTS
ST. THOMAS, VIRGIN ISLANDS

3,600 cu. yds., Rock Fill
1,500 sq. yds., Grouted Riprap
30,000 lin. ft., Wood Piles
141,000 sq. ft. Steel Sheet Piling
194,000 lbs. Tie Rods
327,000 lbs. Steel Reinforcement
6,600 lin. ft., Creosoted Timber Guard Rail (8" x 10")
2,200 cu. yds., "A" Concrete
330,000 cu. yds., Earth Fill
5,700 lin. ft. Pipe in Storm Sewers (15" to 30")
1,200 cu. yds. Rubble Masonry
26 Manholes, Inlets and Catch Basins
2,700 lin. ft. Combined Curb and Gutter
9,000 sq. yds. 6" Concrete Pavement

At which time and place the proposals will be publicly opened and read aloud. Bids received after closing time of bid opening will be returned unopened.

Plans and specifications and other proposed contract documents are open for public inspection at the District Engineer's Office, Charlotte Amalie, St. Thomas, Virgin Islands, the District Engineer's Office, 501 Banco Popular Building, San Juan, Puerto Rico, and Room 3430, General Services Building, Washington, D. C.

A set of such documents may be procured from the office of R. L. Kenan & Associates, Consulting Engineers, Bell Building, Montgomery, Alabama, upon deposit of $25.00, all of which will be refunded to bona fide bidders upon the return of plans and specifications, in good condition, within seven days from date of bid opening.

To parties who procure plans and specifications upon payment of $25.00 and who do not submit a bid, $10.00 will be refunded *provided same are returned within seven days from date of bid opening. No refund will be made for return after this time.*

Each proposal must be accompanied by a bid security in an amount of not less than 5 per cent of the total bid.

The successful bidder will be required to furnish a performance bond in an amount equal to 100 per cent of the contract price, and a payment bond in an amount equal to 100 per cent of the contract price, each bond to cover full performance of the contract and payment for labor and materials.

No proposal may be withdrawn after the scheduled closing time for receipt of bids for at least 30 days.

The Government reserves the right to reject any and all proposals and to waive informalities with respect thereto.

FERE F. SEWARD
Commissioner
(5811)

Office of the District Engineer, Corps of Engineers, U. S. Army, 1217 Post Office and Court House, St. Paul 1, Minnesota. Sealed bids to furnish all labor and materials and perform all work required for Construction of Lower Lock and Dam 1 at Minneapolis, Mississippi River, Minneapolis, Minnesota, will be received at the office until 11:00 A.M., C.S.T., 31 May 1950 and then publicly opened. Further information upon application. (5791)

U. S. Government

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. 2995) will be received by Bureau of Reclamation, Denver, Colorado, May 1, 1950, and then publicly opened for furnishing galvanized-steel double-circuit towers and appurtenances, including connection bolts for attaching tower legs to stub angles for the Garrison-Washburn-Bismarck 230-kilovolt transmission line for Missouri-Souris district, Transmission Division, North Dakota, Missouri River Basin Project. Delivery is desired within 300 days. For particulars, address Bureau of Reclamation, Building 1A, Denver Federal Center, Denver, Colorado.

MICHAEL W. STRAUS, Commissioner
(7133)

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. 2908) will be received by Bureau of Reclamation, Coachella, California, May 24, 1950, and then publicly opened for furnishing labor and materials and performing all work for the construction of operating bridges, Stations 7134+10, 7275+40, and 7453+30, Coachella Canal, All American Canal System, Boulder Canyon Project, California. The work is situated near El Centro, California, and Yuma, Arizona. Principal items are approximately: furnishing and erecting 314,000 lbs. structural steel; 300 cu. yds. concrete; manufacturing and driving 1,650 lin. ft. concrete piles, and other work. Time allowed for completion will be 240 days. For particulars, address Bureau of Reclamation, Coachella, California, or Building 1A, Denver Federal Center, Denver, Colorado.

MICHAEL W. STRAUS, Commissioner
(7119)

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. 2990) will be received by Bureau of Reclamation, Denver, Colorado, May 25, 1950, and then publicly opened for furnishing one 42,500-hp, 150-rpm, vertical-shaft turbine with pressure regulator and energy absorber, and one 18,000-hp, 514-rpm, vertical-shaft turbine with pressure regulator and energy absorber, including model tests, and reports for Colorado-Big Thompson Project, Colorado. Delivery is desired within 660 days. For particulars, address Bureau of Reclamation Building 1A, Denver Federal Center, Denver, Colorado.

MICHAEL W. STRAUS, Commissioner
(7151)

OFFICIAL PROPOSALS

Bids: May 17, 1950 (7211)

Borings

Kingston, New York
Vicinity of Kingston, N. Y.

Sealed proposals will be received by the New York State Bridge Authority at Room 22, Ferry Street, Kingston, New York, until 2:00 o'clock P.M., Eastern Daylight Time, on Wednesday, May 17, 1950, at which time and place they will be publicly opened and read for the furnishing of labor and materials for making borings, including mobilization, and all other work incidental thereto, in and adjacent to the Hudson River in an easterly westerly line across the river at the channel of Mills Point, approximately three miles north of Kingston Point.

Plans, specifications, proposal blanks, form of contract, and information for bidders may be obtained at the office of the New York State Bridge Authority, 22 Ferry Street, Kingston, New York, and copies of the same may be obtained upon application to H. E. Steinman, Consulting Engineer, 117 Liberty Street, New York, New York, upon deposit of Fifteen Dollars ($15.00), which sum will be refunded if the plans and specifications are returned by bidders in good condition within twenty (20) days of bids having been received and opened by the New York State Bridge Authority, but Ten Dollars ($10.00) of the deposit will be so returned to non-bidders.

A certified check on a National Bank, State Bank or Trust Company in the sum of ten per cent (10%) of the amount of the bid, made payable to the New York State Bridge Authority, must accompany the bid, as a guarantee that the contract will be entered into, if awarded.

A bond in the sum of one hundred per cent (100%) of the contract price will be required.

The New York State Bridge Authority reserves the right to reject any or all bids.

JAMES F. LOUGHRAN
Chairman.

Bids: May 8, 1950 (7209)

Furnishing and Delivering Air Compressors

WASHINGTON SUBURBAN SANITARY COMMISSION
CONTRACT NO. 773

Sealed proposals for furnishing and delivering six (6) 160 cubic foot air compressors, trailer mounted and two (2) 105 cubic foot air compressors on skids will be received at the office of the Washington Suburban Sanitary Commission, 4017 Hamilton Street, Hyattsville, Maryland until Monday, May 8th, 1950 at 2:30 P. M. Eastern Daylight Saving Time, at which time and place they will be publicly opened and read.

Specifications may be obtained from W. R. Douglas, Purchasing Agent of the Commission, Hyattsville, Maryland.

Dwight R. Gall, Chairman
Warren Browning
Leland G. Worthington
Commissioners

Bids: May 25, 1950 (7127)

Electric Motor Driven Pumps

CITY OF DETROIT, MICHIGAN

Bids will be taken on May 25, 1950, by the Department of Public Works, on contract PW-1071A, for the furnishing and installing of four main electric motor driven pumping units, each having a rated capacity of 42 cubic feet per second against a 43 foot static head, and two dewatering pumping units, each having a rated capacity of 25 cubic feet per second against a 43 foot static head, and two dewatering pumping units, each having a rated capacity of 25 cubic feet per second against a 43 foot static head, and two dewatering pumping units, each having a rated capacity of 25 cubic feet per second against a 43 foot static head, and two dewatering pumping units, each having a rated capacity of 25 cubic feet per second against a 43 foot dynamic head, for the new freud avenue storm-water pumping station.

Further information regarding bidding requirements may be obtained from the city engineer, 10th floor, Griswold Building, Detroit 26, Michigan.

Bids: May 15, 1950 (7229)

New Mound Park Hospital

CITY OF ST. PETERSBURG, FLORIDA

Previously Advertisement for Bids on the new 250 bed hospital for the City of St. Petersburg, Florida, have appeared in this publication stating that proposals would be received by the City Manager until 12:00 A.M. (EST.) on May 15, 1950. The time and date for receiving bids are hereby changed to 11:00 A.M. (C.S.T.), June 2, 1950. All other conditions of the original advertisement remain unchanged.

CITY OF ST. PETERSBURG, FLORIDA
By: Ross E. Weedon, City Manager

(Continued on page 97)

CONTRACTORS WATCH THIS SECTION
for New Projects.
Publish your announcements thru the "Proposal Section" of Engineering News-Record and get their bids.

U. S. Government
(Continued from page 96)

Notice to Contractors

GENERAL SERVICES ADMINISTRATION
Community Facilities Service
Washington 25, D. C.

Sealed proposals will be received by Rufe B. Hall, Jr., Director, Works Construction Division, Community Facilities Service, General Services Administration, Room 214, General Services Building, Washington, D.C., until 11:00 o'clock A.M., Eastern Standard Time, on May 24, 1950, for the construction of telephone and radio dial facilities outside, on the islands of St. Thomas and St. Croix (U. S. Virgin Islands) as follows:

PROJECT No. 53-III, ST. THOMAS TELEPHONE SYSTEM
(Project No. 13, Public Law 516, 78th Congress)

Subproject 12A — Outside Telephone Plant, St. Thomas.

Subproject 13B — Inside Telephone Plant, Charlotte Amalie.

Subproject 13C — Subscribers' Telephone Plant, St. Thomas.

Subproject 13D — Radio Link Stations, Virgin Islands.

Subproject 13X — Telephone Exchange, Charlotte Amalie.

PROJECT No. 53-IV, ST. CROIX TELEPHONE SYSTEM
(Project No. 13, Public Law 516, 78th Congress)

Subproject 28A — Outside Telephone Plant, St. Croix.

Subproject 28B — Inside Telephone Plant, Christiansted and Frederiksted.

Subproject 28C — Subscribers' Telephone Plant, St. Croix.

Subproject 28X — Telephone Exchanges, Christiansted and Frederiksted.

At which time and place the proposals will be publicly opened and read aloud. Bids received after closing time of bid opening will not be considered.

Plans and specifications and other proposal contract documents are open for inspection at the Public Engineer's office, Charlotte Amalie, St. Thomas, U. S. Virgin Islands; the District Engineer's offices, 301 Ponce Building, Hato Rey, Puerto Rico and Room 214, General Services Building, Washington, D. C. A set of such documents may be procured from the Director, Works Construction Division, at the address at which bids are to be turned in, upon deposit of $10.00, all of which will be refunded to bona fide bidders upon the return of plans and specifications in good condition within seven days of date of bid opening.

Each proposal must be accompanied by a bid security in an amount not less than 5 percent of the bid price.

Bids will be accepted on any single subproject or project.

The successful bidder will be required to furnish performance bonds in an amount equal to 100 percent of the contract price and payment bonds in an amount equal to 100 percent of the contract price, such bonds to cover full performance of the contract and payment of persons furnishing labor and materials.

No proposal may be withdrawn after the scheduled closing time for receipt of bids for a period of 60 days.

The Government reserves the right to reject any and all proposals and to waive informalities with respect thereto.

PIERCE F. SEWARD
Commissioner
(952)

OFFICIAL PROPOSALS

Bids May 17, 1950 (C-8)

Heating Systems

PENNSYLVANIA TURNPIKE COMMISSION
Harrisburg, Pennsylvania

Sealed proposals will be received by the Pennsylvania Turnpike Commission at the office of the Commission located at North Fourth Street, Harrisburg, Pennsylvania, until 2:00 P.M., Eastern Daylight Saving Time, on the 17th day of May, 1950, and immediately thereafter will be opened in the Public Utility Commission Hearing Room, Ninth Floor, Office Building, State Capitol, Harrisburg, Pennsylvania, and will be publicly read aloud, for the furnishing of labor and materials for the construction of Heating Systems for the following four (4) Maintenance Buildings on the Pennsylvania Turnpike, as follows:

Main
Juniata
Bland

Contract No.	Station	County
236-H-1	1+00	York
236-H-2	1+00	Lancaster
236-H-3	12+00	Lancaster
236-H-4	871+00	Chester

The work to be performed under this contract generally is and consists of the furnishing, erecting, installing, testing, instructing and completing complete in every respect and ready for operation, all as called for by the Contract Drawings, Specifications and other contract documents including Reference Drawings, which do not need to be presented to the bidder at the Pennsylvania Turnpike Commission, located at Harrisburg, Pennsylvania, on May 2, 1950 at 10:00 A.M. Plans and contract documents will be available before this date for inspection at the Pennsylvania Turnpike Commission, Harrisburg, Pennsylvania, on May 2, 1950. Reference Drawings may be purchased from the Pennsylvania Turnpike Commission, for the sum of [illegible] dollars ($[illegible]) per set, which sum will be refunded to the bidder upon the submission of a bona fide bid and the return of the Reference Drawings in good condition within [illegible] days after the date of the bid opening. Refund will be made for all plans and specifications returned by the bidder after the expiration of the period of withdrawal from the Pennsylvania Turnpike Commission. Requests for plans and specifications must be made in writing to the Pennsylvania Turnpike Commission and must accompany requests for contract drawings and specifications.

The Pennsylvania Turnpike Commission reserves the right to reject any or all bids, to waive any informality in any bid received and to award each contract as it deems best for the interest of the Commission.

The character and amount of the security to be furnished by bidder is stated in the Instructions to Bidders.

No bids may be withdrawn for a period of [illegible] days after the scheduled closing time for the receipt of bids.

The Pennsylvania Turnpike Commission reserves the right to let any portion of the work under the contract.

PENNSYLVANIA TURNPIKE COMMISSION
Lester P. Barger
Secretary and Treasurer

Harrisburg, Pennsylvania
April 25, 1950

Bids May 2, 1950 (C-11)

Sewage Treatment Plant

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
DEPARTMENT OF PUBLIC WORKS
DIVISION OF PURCHASES

[illegible]

(Continued on page 98)

OFFICIAL PROPOSALS

[illegible]

Electrical Systems

PENNSYLVANIA TURNPIKE COMMISSION
Harrisburg, Pennsylvania

[illegible]

Contractors Watch This Section —

for new projects. Publish your announcements through the proposal sections of *Engineering News-Record* and get their bids.

U. S. Government
(Continued from page 97)

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. 7001) will be received by Bureau of Reclamation, Denver, Colorado, May 25, 1950, and then publicly opened for furnishing hollow metal doors and tin doors for Grand Coulee Pumping Plant and for extra for ES cutting bar R, and units R1 to R9, inclusive, for Grand Coulee Power Plant, Columbia Basin Project, Washington. Delivery to be required within 150 days. For particulars, address Bureau of Reclamation, Building 54, Denver Federal Center, Denver, Colorado.

MICHAEL W. STRAUS, Commissioner.

(7114)

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. 2283-A) will be received by Bureau of Reclamation, Coulee Dam, Washington, June 1, 1950, and then publicly opened for furnishing labor and materials and performing all work for the construction of machine shop, complete with warehouses "A" and "B," and constructing and installing of utilities in the electric area, Coulee Dam Division, Columbia Basin Project, Washington. The work is situated near the left abutment of Grand Coulee Dam, about 3½ miles northeast of Odair, Washington. Principal items are approximately: excavation, 12,000 cu. yds.; erection of building, with 7,000 sq. ft. of concrete and 272,000 lbs. of structural steel; installation of crane, miscellaneous equipment, interconnecting network, and electrical systems; asphalt concrete, 2,000 sq. yds. and other work. Time allowed for completion will vary from 180 to 420 days. For particulars, address Bureau of Reclamation, Coulee Dam, Washington, or Building 54, Denver Federal Center, Denver, Colorado.

MICHAEL W. STRAUS, Commissioner.

(7115)

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation, sealed bid (Specifications No. 7000) will be received by Bureau of Reclamation, Fresno, California, May 24, 1950, and then publicly opened for furnishing labor and materials and performing all work for the construction of earthwork, pipe lines and structures, laterals 58-4W and 59-4W and sublaterals, Lindmore Irrigation District, Cross Creek Canal distribution system, Central Valley Project, California. The work is located in the County of Tulare, California, about 10 miles southeast of Lindsay, California. Principal items are approximately: furnishing and laying 15,000 lin. ft. of concrete pipe; 10,000 cu. yds. excavation; 6,000 cu. yds. excavation for pipe trenches, and other work. The work is divided into 2 schedules. Time allowed for completion will be 140 days. For particulars, address Bureau of Reclamation, Field Headquarters, Building 54, Denver Federal Center, Denver, Colorado.

MICHAEL W. STRAUS, Commissioner.

(7116)

Department of Commerce, Bureau of Public Roads, April 25, 1950. SEALED BIDS will be received at the office of the Division Engineer, Bureau of Public Roads, 1710 Spring Tree Arlington Avenue, Galt Building, Charlotte, North Carolina, until 10:00 a.m., E.S.T., MAY 16, 1950, for the construction of the following Federal-aid highway project: Federal-aid Primary Project No. 221, Part B, Rowan Roads, Parkway, Rowan County, North Carolina, 1.4 miles, Reinforced Concrete Bridges and other work, Tarrett Creek and [illegible] Bridges (2 units). The approximate quantities of the principal items are as follows: Excavation, 20,000 cu. yds.; Reinforced Concrete Pipe Culverts, 1,000 lin. ft.; Reinforced Concrete Box Culverts, 1,000 lin. ft.; Concrete Bridge Slabs, 1,000 cu. yds. Contract Time: 240 calendar days. Plans, specifications, and proposal forms may be obtained at the office of the Division Engineer, Bureau of Public Roads, 1710 Spring Tree Arlington Avenue, Galt Building, Charlotte, North Carolina, and at the office of the District Engineer, Bureau of Public Roads, Raleigh, North Carolina. Bidders are required to submit with their proposals a certified check or bid bond in the amount of 5% of the bid. Specifications and Proposal forms may be obtained at the office of the Division Engineer, Bureau of Public Roads, Charlotte, North Carolina, and at the office of the District Engineer, Bureau of Public Roads, Raleigh, North Carolina. The right is reserved to reject any or all bids.

R. H. BALDWIN, Division Engineer.

(7117)

OFFICIAL PROPOSAL

DATE

CLOSING DATE

SEND COPY OF [illegible] Bureau of Reclamation, Box 8, Old Chelsea Station, New York 11, N. Y.

OFFICIAL PROPOSALS

Bids: May 23, 1950. (7100)

The Delaware Memorial Bridge

NOTICE TO BIDDERS

Sealed proposals for construction of the Pennsylvania Railroad Overpass for The Delaware Memorial Bridge, over the Delaware River in Wilmington, Delaware, will be received by the Delaware State Highway Department at the office of the Director, Delaware Crossing Division, Continental American Building, Wilmington, Delaware, until 11 o'clock Eastern Standard Time (12 o'clock Eastern Daylight Saving Time), May 23, 1950, immediately thereafter proposals will be publicly opened and read in the Council Chamber, Wilmington City Hall.

The work involves the following principal quantities:

- 250 cu. yds. Concrete in Footings
- 450 cu. yds. Concrete in Shaft
- 450 cu. yds. Concrete in Superstructure
- 5,000 lin. ft. Cast-in-Place Concrete Piles
- 16,000 lbs. Reinforcing Steel
- 11 Cubic Ins. Structural Steel
- 250 lin. ft. Pipe Railing

Performance of this contract shall begin promptly after execution of the contract and shall be completed on or before April 1, 1951.

Monthly payments will be made for thirty (30) per cent of the construction completed each month.

Bidders must submit proposals upon forms furnished by the Department.

Each proposal must be accompanied by a certified check or bid bond in the amount of 5% of the bid. The successful bidder will be required to furnish a surety bond or certified check for a sum equal to at least ten (10) per cent of the total amount of the proposal.

The Contract will be awarded or proposals rejected within twenty (20) days from the date of opening proposals. The right is reserved to reject any or all bids.

The Plans and Specifications and other contract documents may be examined at the office of the Director, Delaware Crossing Division, and at the office of the Engineers, Howard, Needles, Tammen and Bergendoff, 25 Liberty Street, New York 5, N. Y. One complete set of the Plans and two copies of the Specifications may be obtained from the Engineers upon payment of $25.00. Any prospective bidder who has made such a deposit may secure extra blueprint copies of the Plans upon payment of 25 cents per drawing, and extra copies of the Specifications upon payment of $2.00 per copy.

All Plans and Specifications shall be returned to the Engineers, and on return of the $10.00 of the above payment will be refunded. No refund will be made out of payments for extra prints of the Plans. Full refund of deposit will be made out of payments for extra copies of the Specifications. All such refunds will be made only upon return of the documents within 10 days after the opening of proposals.

STATE HIGHWAY DEPARTMENT
Gordon Smith, Chairman
W. W. Mack, Director
Delaware Crossing Division
Wilmington, Delaware
April 14, 1950

Bids: May 16, 1950. (7101)

State Road Work

NOTICE TO CONTRACTORS. STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N.Y. Pursuant to the provisions of Highway Law, as amended, and special provisions for projects prepared with federal aid funds, sealed proposals will be received until ten thirty o'clock A.M., daylight saving time, which is nine-thirty o'clock A.M. eastern standard time on Wednesday, May 10, 1950 by Henry A. Gibbs, Director, Division of Contract & Accounts, State Department of Public Works, State Office Building, Albany, N.Y. for the following projects. Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts & Accounts, Albany, N.Y., and at the office of the District Engineers noted below, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

Specifications, plans and proposal forms for contract containing 1 sheet to 25 sheets, $10.00; 26 to 50 sheets, $15.00; 51 to 75 sheets, $25.00; 76 to 100 sheets, $30.00; and for each additional sheet, $10.00. A refund will be made in full to bidders for the returned one set in good condition within 24 days of award or rejection of bids. Refund for all other sets in good condition, similar period, will be 50% of deposit.

County	Contract No.	Name	Miles	Type	Deposit	Cost of Work
		DISTRICT No. 1				
		G. L. Nicassio, Dist. Engr., 150 Broadway, Albany, N.Y.				
Essex	FASS 50-1	Lake Shore Road, Ph. 1, 1.44 mi.	1.44	R. S. & C. Two Course Gravel	$16,000 Plans $25	$124,000
Saratoga	BC 50-15	Palmer, Jct. Rte. 29 - Mass. Line, Ph. 2, 5.31 mi.	5.31	S.T. Con. Pave. on C. Gravel Base	$35,000 Plans $10	$270,000
				Misc. Work	$42,000	
		DISTRICT No. 3				
		Wm. Rousseau, Dist. Engr., 500 E. Washington St., Syracuse, N.Y.				
Oswego	FARC 50-11	Lake Shore Drive, Ph. 1, 2.27 mi.	2.27	Asph. Conc. Type 1A, 2A	$65,000 Plans $25	$1,755,000
Oswego	FAS 315-5	New Haven-Texas, Ph. 2, 2.3 mi.	2.3	2" Con. Conc. Pave. on Gravel Base	$32,000 Plans $10	$249,000
				Misc. Work		
		DISTRICT No. 4				
		A. B. Mercier, Dist. Engr., Court House, Gouverneur, N.Y.				
Greene	FAS 311-50-6	Lehigh Ave., Ph. 1, 1.47 mi.	1.47	R.S. Mac. Type B1, Misc. Work	$6,000 Plans $10	$108,000
		DISTRICT No. 6				
		H. J. Bevan, Dist. Engr., 50 West Main St., Bath, N.Y.				
Schuyler	FARC 50-14	Montour Falls-S. R. Approach, Ph. 1, 1.4 mi.	1.4	Asph. Conc. Type 1A, 2A, Misc. Work	$18,000 Plans $10	$308,000
Steuben	FARC 50-12	Hammondsport-Keuka, S. R. 54 & W. Shore Keuka, Ph. 1, 2.8 mi.	2.8	Asph. Conc. Type 1A, 2A, Misc. Work	$87,500 $65,000 Plans $15	$1,213,000
Tioga	FAC 50-21	Richford-Candor Line, Ph. 1, 3.8 mi.	3.8	Bit. Mac. Type B4, Misc. Work	$16,000 Plans $15	$288,000
		DISTRICT No. 8				
		J. S. Bates, Dist. Engr., Queens Road, Engineers, N.Y.				
Ulster	RC 50-17	New Paltz-Jct. S. R. 44	0.48	Asph. Conc. Type 1A, 2A	$5,250 Plans $10	$84,000
		DISTRICT No. 10				
		J. J. Dacy, Dist. Engr., Municipal Bldg., Queens Plaza North, Long Island City, N.Y.				
Bronx	FAM 10-3-1	Major Deegan Expressway, Ph. 1, Cross Bronx Expressway to Jct. S.R. 1, Pelham Parkway	1.5	Grading & Misc. Work	$25,000 Plans $10	$441,000

Proposal for each contract must be submitted upon a separate form furnished with the contract documents and must be accompanied by a certified check for 5% of the amount bid, made payable to the order of State of New York, Department of Taxation & Finance, for contracts in excess of $20,000, or by a bid bond executed by a surety company authorized to do business in the State of New York. The successful bidder will be required to furnish a surety bond or certified check for a sum equal to at least ten (10) per cent of the total amount of the proposal.

The right is reserved to reject any or all bids, the provisions of the Highway Law, as set forth in "Instructions to Bidders."

When optional types are permitted on contracts with federal funds, bidder must indicate in the space provided in the proposal the type for which he submits his bid. Failure to specify will be cause for rejection of proposal.

The right is reserved to reject any or all bids.

By: H. TALLAMY
Chief, Bureau of Public Works

(Continued on page 99)

OFFICIAL PROPOSALS

(Continued from opposite page)

Bids: May 31, 1950 (699)

Sewage Treatment Plant, Intercepting and Outlet Sewers

THE LINDEN ROSELLE SEWERAGE AUTHORITY
LINDEN, N. J.

1. Sealed proposals for the construction of the herein described contracts of a pollution abatement project in the City of Linden, New Jersey, will be received by the Linden Roselle Sewerage Authority in the Council Chamber, City Hall, Linden, on the 31st day of May, 1950, at 8:00 P.M. on Wednesday, May 31, 1950, and there publicly opened and read immediately thereafter.

2. The work will consist of furnishing all labor, materials, equipment and incidentals required for the construction of the following:

Contract I—Intercepting and Outfall Sewer. (Approx. 1500 L.F. of 10-inch R.C. Pipe, 1500 L.F. of 8-inch R.C. Pipe, 500 L.F. of 60-inch R.C. Pipe and appurtenant structures). *Contract II—Plant Outfall Conduit & Sludge Force Main.* (Approx. 2600 L.F. of concrete flume, 26,000 L.F. timber piling, 1900 L.F. 24-inch R.C. Pipe and appurtenant structures). *Contract V—Sewage Treatment Plant.* (Primary treatment works including pumping station and including approx. 2,000 cu. yds. excavation, 5,500 cu. yds. of concrete, 285 tons of iron pipe and fittings, 1800 L.F. timber piling, chlorination equipment, mechanical equipment and appurtenances). *Contract VI—Sewage Treatment Plant Superintendent's Residence.* (Construction of concrete building, approximately 7,000 cu. ft.). *Contract VII—Structural Steel for plant buildings.* (Approx. 50 tons). *Contract VIII—Heating and Ventilating for plant buildings.* *Contract IX—Plumbing Work for plant buildings.* *Contract X—Electrical Work for sewage treatment plant.*

3. Plans, specifications, bidding and contract documents may be examined at the office of the Consulting Engineers, Alvord, Burdick & Howson, 20 Church Street, New York 7, N.Y., and there obtained upon the following deposits per set:

Contract I—Intercepting and Outfall Sewer, Contract II—Plant Outfall Conduit & Sludge Force Main, $25.00; Contract V—Sewage Treatment Plant, Primary Treatment Plant, Sewage Treatment Plant Superintendent's Residence, $30.00; Contract VII—Structural Steel, $10.00; Contract VIII—Sewage Treatment Plant Heating & Ventilating, $10.00; Contract IX—Sewage Treatment Plant Plumbing Work, $10.00; Contract X—Sewage Treatment Plant Electrical Work, $10.00.

Full refund will be made to bona fide bidders for returned sets in good condition, within two weeks after award of contract or rejection of bid. Refund for returned sets will be made to the depositor. Plans, specifications and contract documents will be available at the office of the Consulting Engineers on and after May 15, 1950. Plans, specifications and contract documents will be made available for inspection at the office of Alvord, Burdick & Howson, Associates.

4. All proposals must be made on the forms furnished by the Authority.

5. Each bid must be accompanied by a certified check or cash bond under seal for the sum of 5% of the amount of the bid, made payable to The Linden Roselle Sewerage Authority, which check or cash bond will be returned to the successful bidder or bidders entering into contract and furnishing bond as hereinafter specified, within ten days after the opening of bids.

6. The successful bidder or bidders will be required to furnish a surety bond or bonds in the full amount of the contract price, conditioned upon the faithful performance of the contract and upon the payment of all persons performing labor and furnishing materials in connection with the work.

7. No bidder may withdraw his bid within sixty days after the actual date of the opening thereof.

8. The Authority reserves the right to reject any or all bids and to waive any informality in the bid.

BY ORDER OF THE AUTHORITY
SECRETARY OF THE LINDEN ROSELLE SEWERAGE AUTHORITY

DATED: April 27, 1950

READ THE OFFICIAL PROPOSAL COLUMNS OF ENGINEERING NEWS-RECORD THIS WEEK AND EVERY WEEK

SEARCHLIGHT SECTION

(Classified Advertising)

EMPLOYMENT: BUSINESS: **"OPPORTUNITIES"** :EQUIPMENT :USED OR RESALE

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$1.25 a Line, minimum 4 lines. To figure advance payment count 7 average words as a line. INDIVIDUAL EMPLOYMENT WANTED undisplayed advertising rate is one-half above rate. Cash in advance. Numbers in care of our New York, Chicago and San Francisco offices count as one additional line. Replies are forwarded each day as received at each of the offices mentioned without additional charge.

Discount of 10% is allowed if full payment is made in advance for 4 consecutive insertions.

DISPLAYED RATE

The advertising rate is $10.00 per inch for all advertising appearing on other than a contract basis. Contract rate quoted on request. Advertising space is measured in inch vertically on the column, 3 columns—10 inches to a page. E.N.R. Now a combination contract for May 11th will appear in the May 18th issue.

ESTIMATOR—Wanted

Growing concern, doing building, sewer, road and general construction in Ohio. Experienced man preferred, permanent position. State qualifications, exp., age, former employer, references, salary expected, first letter.

P-6163, Engineering News Record, 330 W. 42nd St., New York 18, N. Y.

REPLIES for NEW YORK addresses to office nearest you
NEW YORK 330 W. 42nd St. 18th
CHICAGO 520 N. Michigan Ave. 11th
SAN FRANCISCO 68 Post St. 4th

CIVIL SERVICE

POSITIONS VACANT

WANTED

PROJECT ENGINEERS
FIELD ENGINEERS

and inspection staff by large, long established engineering organization for long term water development program in Texas and Oklahoma areas. Supervisory and inspection staff must be experienced on dams, powerhouses, water supply and irrigation. Vacancies include resident engineers, layout engineers, concrete technicians, field accountants, surveyors, and inspectors. Resident engineers must be college graduates qualified by ample experience to take complete charge of engineering on large contract projects under Chief Engineer. Please submit completely detailed personal, education, and experience record and salary requirements with first letter. All replies strictly confidential.

P 6113, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

ESTIMATOR

Experienced ENGINEER, familiar with Oil Refinery design and capable of estimating process equipment from flow diagrams.

Give full information, experience record and salary expected.

ARTHUR G. McKEE & CO.
2300 CHESTER AVE.
CLEVELAND 1, OHIO

GRAVEL PLANT SUPERINTENDENT

Wanted for operating and managing portable and permanent plants in Indiana and Michigan. State experience, references and salary.

P-6206, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

ENGINEER, LICENSED
in New York State

Also Sales Engineer

Experienced in bridge construction and alterations. Permanent position for right man. Reply stating experience to

P-6208, Engineering News-Record
330 W. 42nd St., New York 18, N. Y.

Additional Employment Advertising on page 100

A Course of Instruction by Mail in

STRUCTURAL ENGINEERING

FOR FORTY YEARS our courses have helped thousands to better positions and to pass State Board Examinations.

Information sent without obligation. Write today.

WILSON ENGINEERING CORP.
College House Offices - Dept. E
Harvard Sq. Cambridge, Mass.

WANTED SUPERINTENDENT

For Sewage and Water line construction operating principally in Indiana. Write only for interview, giving experience in the above line of work, age, reference, salary expected.

P-6318, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

ESTIMATOR
WANTED

In Phila., experienced in general heavy construction work. Give information on experience, salary, availability. Experience with contractors preferred.

P-6311, Engineering News-Record
330 W. 42nd St., New York 18, N. Y.

SURVEYOR WANTED

Top-notch registered surveyor capable of assuming charge of highway and bridge surveys for consulting engineer in Pittsburgh. Good salary, working conditions, and permanency. Our employees know of this ad.

P-6161, Engineering News-Record
330 W. 42nd St., New York 18, N. Y.

CONSTRUCTION SUPERINTENDENT

Full charge experience on largest Class A buildings only.

Apply before May 12

Rm. 305 State Bldg. 217 W. 1st St., L.A.

WANTED
CONSTRUCTION SUPERINTENDENT

For open caisson work. Write for interview, state age, experience, qualifications, reference and salary expected. Apply

P-6425, Engineering News-Record
330 W. 42nd St., New York

ESTIMATOR

Wanted by old established Pittsburgh firm of commercial and industrial contractors. Must have had experience with contractors engaged in similar work. State salary, experience and when available. Splendid opportunity for advancement.

P-6309, Engineering News-Record
330 W. 42nd St., New York 18, N. Y.

for
DIRECT CONTACT
with the
MOST ACTIVE BUYERS
throughout the field of
ENGINEERING
CONSTRUCTION—

Use the
Searchlight Section
ENGINEERING NEWS-RECORD

POSITIONS WANTED

MECHANICAL SUPERINTENDENT. Twenty-five years experience with erection operation and maintenance of heavy industrial construction and mining equipment. Past six years in Latin American operations. Speaks Spanish fluently. Will go anywhere. Immediately available. PW-6316, Engineering News-Record

AMBITIOUS CHIEF Accountant, Controller. Twenty-five years with leading engineering and construction firms. Know corporate setups, flash reports and costs all types construction. Broad experience large fixed venture and cost plus fixed fee projects. Employed but desire change, references and bond. Go anywhere. PW-6316, Engineering News-Record

GRADUATE CIVIL Engineer, 25, married. Three years engineering experience with the U. S. Government desires field office position in east or middle west. Available August 1st. PW-6317, Engineering News-Record

SUPERINTENDENT CONSTRUCTION, 25 years broad experience, mechanical, industrial or institutional projects. Engineer, degree. Salary open. PW-6316, Engineering News-Record

CIVIL ENGINEER, P.E. license. Age 35, 10 years experience in planning, design, layout, administration, purchasing and plant engineering. Desires association with Architect-Engineer or Consulting Engineer specializing in Industrial Contractor interested in well paying opportunity with future. PW-6219, Engineering News-Record

CONSTRUCTION ENGINEER—Superintendent. 14 years experience supervising and managing both large and small projects. Commercial, industrial and bridge construction, including process piping, electrical and conditioning. Reinforced concrete, steel and masonry. Qualifications: Thorough knowledge estimating, subcontracting, job supervision, scheduling and cost control. College graduate. PW-6315, Engineering News-Record

CIVIL ENGINEERING Graduate, 25, single. Six years experience with consulting Sanitary Engineers. Construction work in midwest preferred. PW-6311, Engineering News-Record

STRUCTURAL DESIGNER checker, college graduate, engineering degree, seven years in reinforced concrete and steel details in Illinois work. Will travel. PW-6302, Engineering News-Record

CONSTRUCTION MGR. Grad. Engr. Exp. in heavy and industrial construction, including bldg. Skilled estimator in all trades. Salary $125.00 week. PW-6310, Engineering News-Record

AVAILABLE AT once, Graduate Mechanical Engineer, 28, married, two years experience in oil and food manufacturing. Two years experience in food processing. Desires plant engineering or sales engineering. Write Box 1, P.O. Box 97, Mansfield, Wisconsin. Phone 1129-R.

FAMILY MAN, 28, seeking fairly localized position in construction engineering. Graduate, age, where I can use 3½ years varied experience in mechanical and structural engineering and construction, including concrete, steel and timber construction, sales engineering, job engineer, job superintendent, part-time heating draftsman, etc. Well versed in financial and estimating. Presently employed but will move with reasonable offer. Will go anywhere. Write for interview and information. PW-6315, Engineering News-Record

PART TIME WORK WANTED

ENGINEER SKILLED in the design of foundations, earth and concrete dams, tunnels, power plants, etc., would like to supplement your income. Box 665, Philadelphia, Pa.

EXCAVATION WORK

Wanted, a number of 2 machine coal grading and excavating contracts. Will go anywhere. Give a brief description of the work you have to offer, together with your price for the above work.

IMPERIAL COAL & CONST. CO.
Box 346 Rupert, W. Va. Tel. 26 R 5

SUBMERGED PIPE LINE CONSTRUCTION
BOYCE COMPANY
Phone 3-2530 Clearwater, Fla.

Legal Notice

1. SEALED BIDS for the sale of
BOILERS AND STEAM POWERED
ELECTRIC GENERATING EQUIPMENT
WITH APPURTENANCES
will be received by the City of Coshocton, Ohio, at the office of the Director of Public Service in the City Hall, Coshocton, Ohio, until
12 O'CLOCK, NOON,
EASTERN STANDARD TIME,
THURSDAY, MAY 25, 1950,
and at that time and place will be publicly opened and read aloud.

2. The equipment which is no longer required, and is being offered for sale by the City of Coshocton, consists in general of the following boilers and generating equipment with appurtenances now located in the existing waterworks power plant of the City:

a. 2—each 138 H.P. Erie City water tube boilers with automatic stokers powered by 5 H.P. electric motors with one spare motor. 2—duplex steam powered feed water pumps. 1—duplex electric motor driven feed water heater, zeolite water softening unit.

b. 2—each 250 H.P. Skinner Engine Company universal Uniflow steam engine, direct connected to 150 K.V.A. generators with exciters.

c. 1—Power and Light switchboard with Voltage Regulator.

d. Steam Piping and miscellaneous small water piping and conduits.

3. All bids shall be submitted in letter form to the said Director, shall be on the basis of the purchase by the bidder of the equipment as said equipment is now located, and shall provide for removal of the equipment by the bidder from the existing power plant to the place of disposal by the bidder.

4. All bids shall be signed, shall state the names of materials and other supplies, and shall be enclosed in a sealed envelope marked "Bid for Purchase and Removal of Existing Power Plant Equipment."

Each bid must contain the name of every person, firm or corporation interested in said bid, and if no other person be interested it shall distinctly state the fact. Each bid must be accompanied by a certified check, cash or a bid bond in the amount of 50% of the bid, made payable to the City of Coshocton, Ohio, as a guarantee that if the bid is accepted a contract will be entered into. The remaining 50% of the purchase price shall be paid to the city prior to the removal of any of the equipment. Successful bidder must provide Liability and Property Damage insurance with limits satisfactory to the Director of Public Service and Workmen's Compensation Insurance as required by law. Bidder will be informed within 15 days as to the scheduled time for removal of bids.

5. The City of Coshocton, Ohio reserves the right to reject any or all bids, to waive any irregularities in bidding, and to accept the bid or bids deemed to be best for the City.

By Order of the Director
of Public Service
City of Coshocton, Ohio
Russell W. Hanlin, Director

FOR PROMPT ANSWERS
to your business problems
use
The SEARCHLIGHT SECTIONS
(Classified Advertising)

American Machinist	Engineering News-Record
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Business Week	Factory Management and Maintenance
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Chemical Engineering	Food Industries
Coal Age	Nucleonics
Construction Methods	Operating Engineer
Electrical Construction and Maintenance	Power
Electrical Merchandising	Product Engineering
Electrical World	Textile World
Electronics	Welding Engineer
Engineering and Mining Journal	

For advertising rates or other information address

Classified Advertising Division
McGRAW-HILL PUBLISHING CO., INC.
New York 18, N. Y.

USED EQUIPMENT

AVAILABLE FOR QUICK DELIVERY

New—**MARION**, 20 ton Motor Crane, 80' folding boom, 30' jib, BUDA gas engine powered.

HUGHES-KEENAN Rustabout CRANE, Model MC1R, with 16' boom, mounted on International Harvester TD-14 DIESEL CRAWLER TRACTOR. In fair condition.

New—**INTERNATIONAL-HARVESTER** SUPER A WHEEL TRACTOR with OTTOWA LOADER.
Bargain priced to move.

LORAIN, Model TL-20 CRAWLER, powered by WAUKESHA gas engine, 30' boom, clamshell equipment and lifting crane equipment. Made in 1948. In excellent condition.

INGERSOLL-RAND, Model 5C0, 2 stage Air compressor, WAUKESHA gas engine, clutch, electric starter, 4 solid rubber tires. New in 1939, good condition.

P & H Model 600, $1\frac{1}{4}$ yard CRAWLER Shovel powered by gas engine.
This is an outstanding "BUY"

New—No. 3 and No. 5 DUREX SAW TABLES with gasoline power.
Specially priced for quick disposal.

ALLIS-CHALMERS, Model HD-7 TRACTOR, 63" tread, canopy, starter, Gar Wood hydraulic bulldozer. Mfg. in 1947. In good condition.

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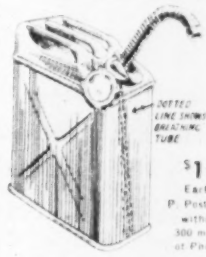

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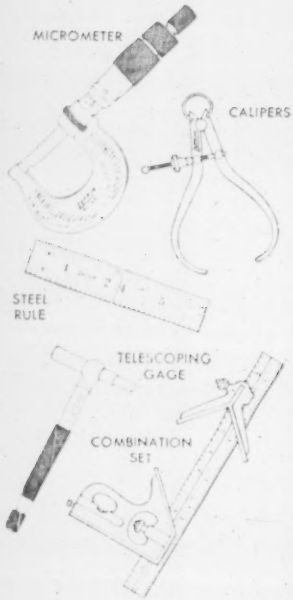

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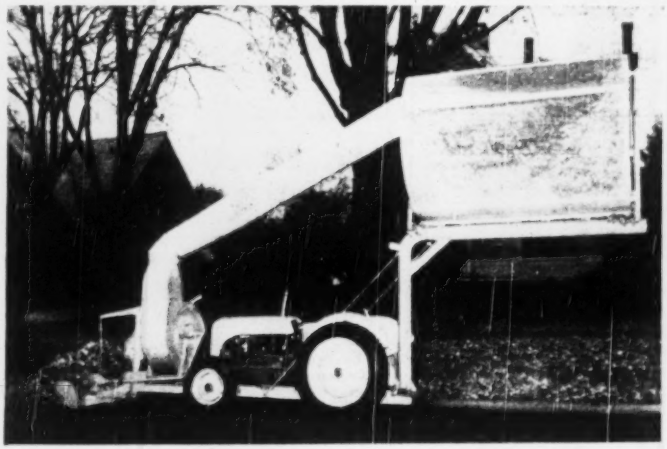

One-Man Leaf Collector

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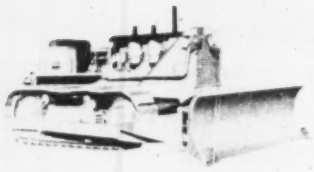

New Line of Bulldozers

New line of bulldozers and trailbuilder equipment is designed for use on current model Allis-Chalmers and Caterpillar tractors. Overhead A-frame structure has been eliminated to provide proper balance the full length of the track drive, and better visibility for the operator. Equipment can be furnished for gear or front-mounted control units. Bulldozers are available in either angle bowl or tilting bowl types.—SOUTHWEST WELDING & MFG. CO., ALHAMBRA, CALIF.

Electric Steam Boiler

Electro-Matic steam boiler produces small or moderate amounts of steam up to full 200 lb. pressure. It can be used as a steam cleaner and will handle two cleaning nozzles. Tested for working pressures up to 150 lb. it will stand a 300-lb. cold-water test. The new Sieburg unit is available in 40, 60, and 80 gal. sizes. Boiler hp. depends upon number of elements. Each element of 10 kw. develops 1 boiler hp. Boilers are furnished in sizes from 1/10th to 10 hp.—SIEBURG MFG. CO., GRINNELL, IOWA.

Electronic Pipe Detector

Feature of the Model 505 pipe detector is use of a metal case to increase durability and to shield loops and increase efficiency. The 505 can be used to locate pipes and cable, trace their path, to center pipes exactly, and to obtain an estimate of the depth. Location of services, stubs, and valve boxes can also be detected.—DETECTRON CO., 5637 CAHUENGA BLVD., DEPT. T, NORTH HOLLYWOOD, CALIF.

Conveyor Safety Backstop

Automatic prevention of backing up or running away of inclined conveyors, bucket elevators, and similar equip-

(Continued on page 111)

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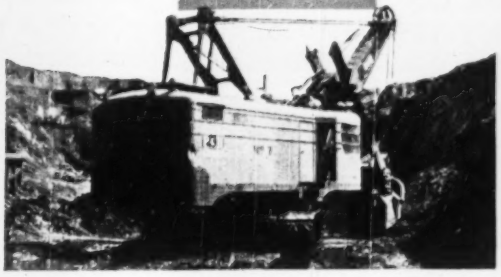

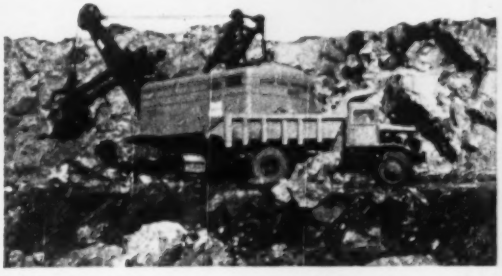

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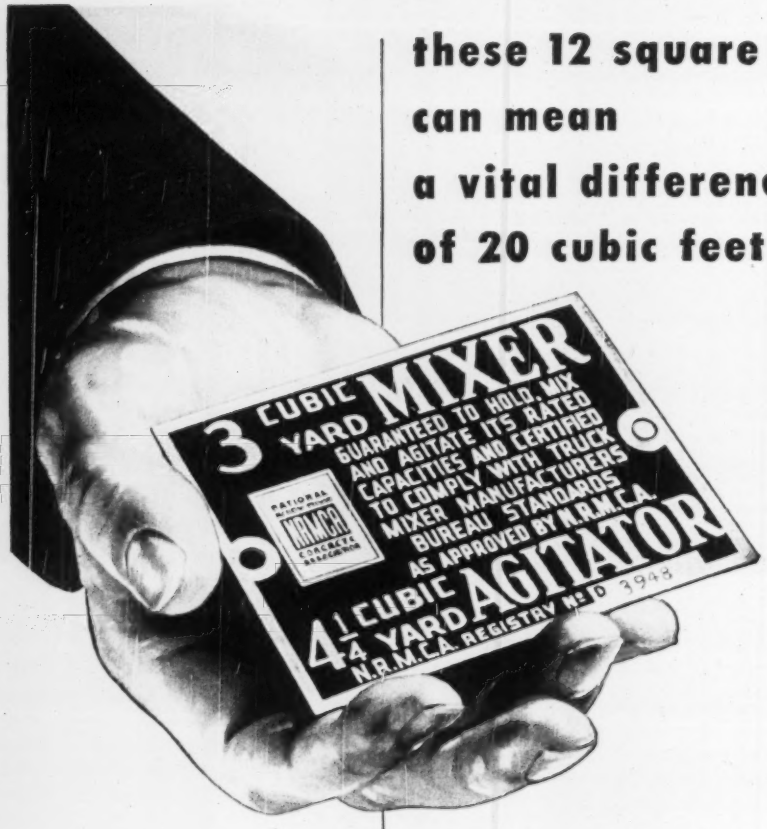
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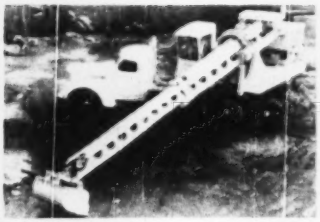

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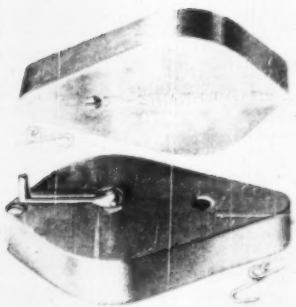


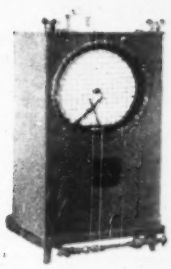
Chalk-Line Box

Self-chalking chalk-line box features an air-tight case for holding both line and pigment. These containers have self-locking handles and feature light weight. Each box is furnished with 50 ft of line, and has a capacity for

Continued on page 114

HOW TO CHECK WATER WASTE AND LEAKAGE

with Simplex Pitot Equipment



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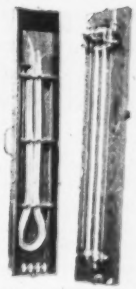

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No pipe that is provably deficient in any of these strength factors should ever be laid in city streets

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In full length bursting tests standard 6-inch cast iron pipe withstands more than 2500 lbs. per square inch internal hydrostatic pressure, which proves ample ability to resist water-hammer or unusual working pressures.

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The toughness of cast iron pipe which enables it to withstand impact and traffic shocks, as well as the hazards in handling, is demonstrated by the Impact Test. While under hydrostatic pressure and the heavy blows from a 50 pound hammer, standard 6-inch cast iron pipe does not crack until the hammer is dropped 6 times *on the same spot* from progressively increased heights of 6 inches.

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The ability of cast iron pipe to withstand external loads imposed by heavy fill and unusual traffic loads is proved by the Ring Compression Test. Standard 6-inch cast iron pipe withstands a crushing weight of more than 14,000 lbs. per foot.

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When cast iron pipe is subjected to beam stress caused by soil settlement, or disturbance of soil by other utilities, or resting on an obstruction, tests prove that standard 6-inch cast iron pipe in 10-foot span sustains a load of 15,000 lbs.

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New York • Philadelphia • Chicago • Berkeley, Calif.

50 more. Dimensions: 5 in. long, 3 in. wide, and 1 in. deep.—STRAIT LINE PRODUCTS, P. O. BOX 417, SANTA ANA, CALIF.

Hoe-Type Mixer

Mortar, plaster, and concrete mixer has a 6 ft drum capacity. The DeLuxe Wonder features sealed hoe and pick shaft bearings, renewable blades, reversing axle, and adjustable scraper blades. When equipped with caster type wheels, it has a 31 in. over all width. The CMC mixer can be equipped with special grating and bag splitter to comply with safety codes. Abrasion-resisting steel liner is available for heavy duty work.—CONSTRUCTION MACHINERY CO., BOX 120, WATERLOO, IOWA.

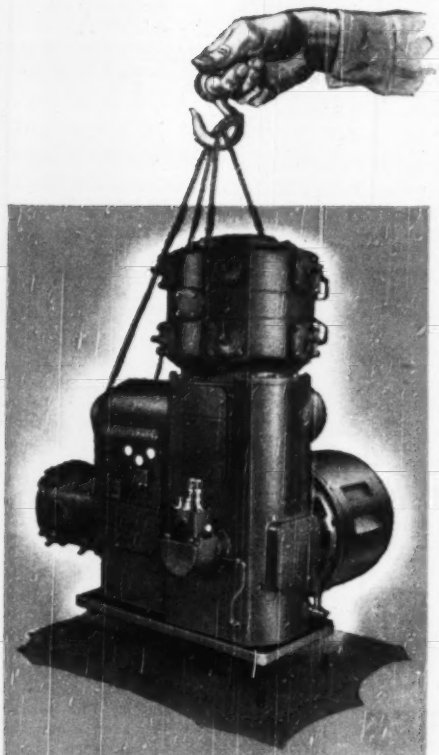
New Product Briefs

Gas unit heater is self contained and fully automatic. Users of unit heating systems for large buildings requiring instant warmth can heat or restrict heat in sections and rooms at will without basic alterations of the system. Maker: Reznor Mfg. Co., Mercer, Pa.

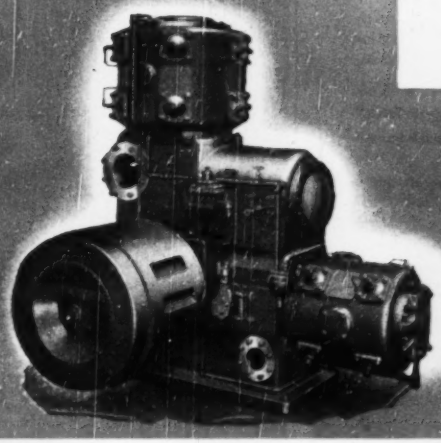
Fluorescent light starter automatically starts good lamps and cuts out inoperative ones eliminating annoying flicker and conserving the starter. The Gold-O-Matic starter is guaranteed for 10,000 starts. Maker: Luxor Light Products, Inc., New York 1, N. Y.

Quick-disconnect coupling in 6 in. pipe size is designed for heavy-duty applications. A 40 deg turn makes or breaks the connection. Maker: Rockwyn, Inc., Glendale 3, Calif.

Close-coupled steam turbines have integral reduction gears for low-speed applications. The Type L turbine is manufactured by Westinghouse.



- A "new look" with these new ideas
- Air connections on sturdy frame
- Pipeless, thru-frame air flow
- Packaged, high efficiency intercooler
- Improved Channel valves
- Aluminum, full-floating bearings



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Here's the Compressor

YOU ASKED FOR

Built to meet your exacting specifications for a heavy-duty unit from 125 to 350 hp . . . 80 to 125 psi pressures

1. **Built for reliable, continuous full-load service.**
2. **Packaged design** for minimum floor space, and specially balanced for minimum foundation . . . ideal for skid mounting.
3. **Easy to install and relocate** . . . ready-to-run assembled shipment . . . simplified air and water piping.
4. **Simplifies support for air piping** because connections are on sturdy compressor frame instead of on cylinders.
5. **Totally enclosed, dust-tight construction.**
6. **Easy to operate** . . . push button starting, grouped controls, automatic force-feed lubrication, automatic condensate removal, automatic air-operated starting unloaders and capacity control.
7. **Easy to maintain** . . . simplified, long-life construction . . . full-floating, cool-running aluminum alloy bearings . . . no adjustments necessary, no need to open crankcase which stays clean.
8. **Low operating costs** . . . new, high-efficiency, long-life I-R Channel Valves result in compressor efficiency comparable to large units . . . high-efficiency tube and finned intercooler saves water . . . efficient direct-connected motor.
9. **Wide range of sizes** . . . 125, 150, 200, 250, 300, 350 horsepower for 80-125 psi discharge pressures.

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The new *Packaged* L-DESIGN
AIR COMPRESSOR
you'll want to know more about the XLE

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ROCK DRILLS • AIR & ELECTRIC TOOLS • OIL & GAS ENGINES • PUMPS • TURBO BLOWERS

only a 1-Man JOB WITH A SAUERMAN EXCAVATOR

Nothing else moves earth quite like a Sauerman Scraper or Cableway Excavator. It saves you dollars and headaches on long range material handling jobs with its simple operation low fuel requirements small maintenance charges flexibility sturdiness and dependability.

Tough ground conditions don't stop a Sauerman Machine. It will dig and haul anywhere on a hillside, in muck, deep under water. Controlled by one easily trained man. Gasoline, electric or Diesel power. There's a wide range of sizes and models to meet every requirement.

Illustrations of typical uses, complete specifications, engineering data, are given in the Sauerman Catalog. Write for it now.

Sauerman Slackline Cableway of 1 cu. yd. size pictured above, digs gravel from under water and delivers to screens on top of bins. One man's labor and a moderate expenditure of power moves 65 cu. yd. an hour.

Here is a small Sauerman Power Drag Scraper delivering gravel to a hopper that feeds to a crusher. The scraper, controlled by one man from a central operating station, swings in a wide arc to dig a large, deep pit.

SAUERMAN BROS., Inc.

532 S. Clinton St. Chicago 7, Ill.

Why WISCONSIN ENGINES

are Air-Cooled

Air-Cooling, as developed and perfected by Wisconsin Motor Corporation engineers, has these important advantages for the power user:

1. Greatest freedom from cooling chores and troubles. More Service FROM the engine, less service TO the engine; fewer Man-Hours lost; more H.P. Hours on the job.

2. Most efficient cooling at all engine speeds and all temperatures, from sub-zero to tropical highs. The engine never runs out of AIR!

3. Lowest maintenance cost. Integrally cast flywheel fan eliminates all cooling "accessories" . . . nothing to get out of order, wear out, or require replacement.

4. Lighter engine weight and greater compactness . . . for most convenient portability and greatest installation adaptability as power components on original equipment.

Every Wisconsin Engine from the smallest to the largest (3 to 30 hp., single cylinder, 2-cylinder and 4-cylinder) has all the advantages of dependable AIR-COOLING, plus heavy-duty design and construction throughout.

WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines

MILWAUKEE 14, WISCONSIN

Manufacturers' Publications

Lighting Guide—Concise 32-p "Planning Guide to Improved Plant Lighting" describes latest concepts of good lighting. The guide covers the subject from management's viewpoint, breaking the problem into three major parts: Economics, Program Development, and Equivalent Selection.—BENJAMIN ELECTRIC MFG. CO., DES PLAINES, ILL.

Welding Handbook—Complete data on several new products are presented in revised 32-p pocket-size combination low-temperature welding handbook and catalog. This illustrated booklet lists the All-State rods and fluxes, contains tables of characteristics, full application information, and helpful hints of general interest.—ALL-STATE WELDING ALLOYS CO., INC., 273 FERRIS AVE., WHITE PLAINS, N. Y.

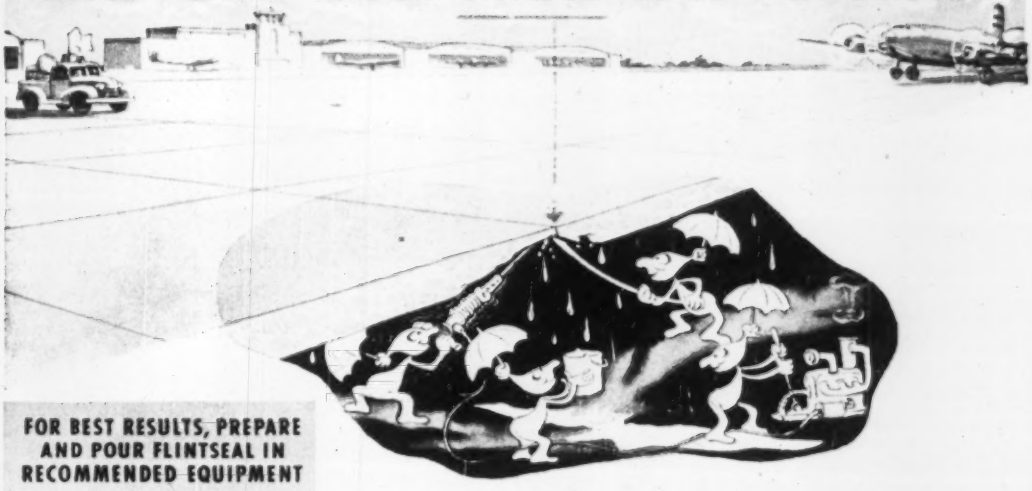
Equipment for Power Control—Loose-leaf catalog describes panel boards, switchboards, control consoles, gage boards, and other power control equipment. Loose-leaf style permits the insertion of timely data sheets as they are made available. The present edition consists of eleven pages describing, besides the equipment listed, the T&C engineering department, list of users of T&C equipment, an example of a typical problem solved by T&C, and other miscellaneous data.—TAYLER & COOPER, INC., 75 FRONT ST., BROOKLYN 1, N. Y.

Dust Collectors—Dry-ash collectors for coal- and bark-burning boilers are completely described in two bulletins. One bulletin describes the Bubar Type S collector designed to meet plant requirements at minimum operating cost; the other is a thorough discussions of dust and dust problems. The discussion is amplified by the use of numerous engineering tables and charts. Bulletin on the Type S is free; "Dust Problems" costs $1.00.—BUBAR DUST SYSTEMS, INC., OLD LYME, CONN.

Sectional Scaffolding—Basic units and adaptations for constructing sectional scaffolding are subject of 4-p data sheet. Individual components are illustrated and described in detail. These include the special Waco lock, stirrup and end frames, brackets, putlog, adjustment screw, braces, casters, hangers, and floor standard. The data sheet lists safety rules for using scaf-

(Continued on page 119)

Don't Let It Rain *Under* Your Pavement



Moisture and other foreign matter...infiltrating at the joint...play havoc with pavement. Get Positive protection with FLINTSEAL.

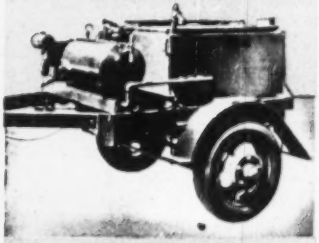
Here's a short cut to long life and low maintenance for highways, airport runways and other concrete pavement: *protect each and every joint with Flintseal.**

You'll get a smooth, neat joint that *far* outlasts old-fashioned materials. And you get a trouble-free, *positive* seal.

Why? Because Flintseal *stays* resilient. It won't flow . . . even in hottest weather. It won't become brittle and crack . . . even on the coldest days. As a result, Flintseal forms a tight, lasting bond to concrete that maintains a *positive* seal throughout repeated cycles of expansion and contraction of the slab.

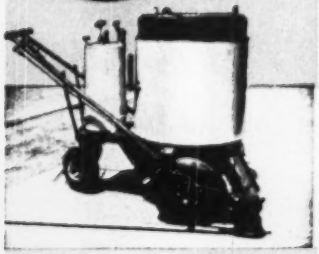
Complete information and application data on Flintseal are yours for the asking. Write, today, for your *free* copy of our latest folder on this modern, rubber-bearing, thermoplastic joint-sealing compound.

FOR BEST RESULTS, PREPARE AND POUR FLINTSEAL IN RECOMMENDED EQUIPMENT



One of the specially designed melting kettles used with Flintseal on large jobs.

This recently developed portable kettle is ideally suited to prepare the small amounts of Flintseal necessary for sealing industrial floors, steps, stadia, swimming pools, driveways, roofs and the like.



A special shoe to fill and wipe the joint means that you'll get a clean, neat job with this type pouring pot. Circulating hot oil bath in the jacketed kettle keeps Flintseal at proper pouring temperature.

THE FLINTKOTE COMPANY, *Industrial Products Division*
30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

ATLANTA • BOSTON • CHICAGO HEIGHTS • DETROIT • LOS ANGELES
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HOT-POURED JOINT-SEALING COMPOUND

when the
BUTLER ENGINEER
has a Hand
in it
...the Design
is RIGHT!
Lines that come from the BUTLER
Engineer's drafting pen are much more than space
dimensions. They represent ingenious solutions
to problems of terrain, material storage and
material flow. They designate the most efficient
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They point the way to highly automatic operations
that drastically cut labor costs, that reach
new standards of fast production and greater
profits to the owner.
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RIGHT solution call in the
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WAUKESHA, WISCONSIN

foldings, and illustrates typical application of the Wico mats.—Watson Albrecht Co., Inc., 3565 Woodhale Ave., Minneapolis 16, Minn.

Hand Hoists—Compact, efficient hand hoists in capacities from ¼ to 4 tons are described in 6-p Folder DH-164. The booklet includes such information as complete specifications, action photographs, cross-sectional views of the hoists, graphic illustrations, and a listing of the hoist features.—Wright Hoist Division, American Chain & Cable Co., Inc., York, Pa.

The Repair of Cutting Tools—How to Repair Broken Cutting Tools with Easy-Flo Silver Brazing Alloys is the subject of Bulletin No. 14. More than twenty before-and-after pictures are used to show the strength, durability, and money-saving features of the use of silver brazing alloys. A 6-p preface explains the use of these low-temperature alloys in repairing drills, gears, saw blades, and other cutting tools.—Central Steel & Wire Co., P. O. Box 5510-A, Chicago 80, Ill.

One-Ton Lift Truck—Eight pages of model views, action photographs, and descriptive text make up Catalog H55 covering the Hyster 2,000-lb-capacity Model 20 lift truck. New features, specifications, and other details of the Model 20 are listed in this bulletin.—Hyster Co., 2953 N. E. Clackamas, Portland 8, Ore.

How to Handle Shellac—Accurate and interesting information on how to use shellac is available in an 18-p handbook. This bulletin describes the properties of shellac, recommended uses, how to thin shellac, how to cut it to proper consistency, and how to apply it. The booklet also describes staining and color, use of shellac as a base for wax, varnish, paint, or lacquer, and other uses.—The Shellac Information Bureau, 65 Pine St., New York, N. Y.

Diesel Engines, Tractors—Caterpillar catalogs available this month include Form 12676 (29 pp.) on the D8 tractor, and Form 12525 (16 pp.) on Models D397, D386, D378, and D364 diesel engines. Both catalogs are thoroughly illustrated and contain complete specifications and capacity ratings.—Caterpillar Tractor Co., Peoria 8, Ill.

Storage-Tank Floating Roofs—Horton floating roofs for reduction of evaporation loss and corrosion and elimination of fire hazards in flat-bottom tanks storing volatile liquids and

(Continued on page 122)

CLEVELANDS

Built to DELIVER
ON THE TRENCHING JOBS

GAS
WATER
DRAINAGE
SEWER
OIL
CABLE
CONDUIT
GASOLINE
BUILDING
FOUNDATIONS
IRRIGATION

And CLEVELANDS will deliver on your jobs as they have on thousands of miles of trench in all parts of the world for more than 25 years. CLEVELANDS give you more and cleaner trench on more different kinds of jobs through correct wheel-type design and a wide range of transmission-controlled digging and crawler speed combinations. CLEVELANDS give you more actual working time through their tough all-welded construction that means less maintenance down-time and through their quick moves from job to job on truck or trailer. CLEVELANDS give you easy handling and remarkable maneuverability through hairline controls and perfect balance on a wide full-crawler mounting. And CLEVELANDS give you the guts and power to keep your trench out in front under the most punishing field conditions during more months of the year. See your local distributor today or write direct for the full story on how CLEVELANDS deliver MORE TRENCH—IN MORE PLACES—AT LESS COST

THE CLEVELAND TRENCHER CO.
20100 ST. CLAIR AVENUE • CLEVELAND 17, OHIO

NO PUSH . . . NO PULL . . . with

Cuts HARD WORK, HIGH COSTS because:

Kwik-Mix fully-powered Moto-Bug travels 1½ to 4 m.p.h. both forward AND REVERSE. Power does ALL the hard work.

Positive steering, plus riding step (optional), lets operator ride while traveling, spotting and backing up.

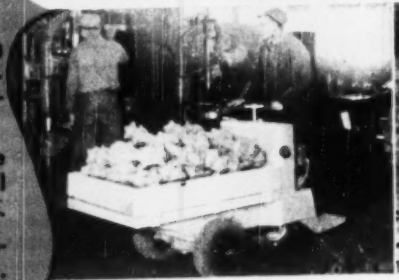
Carries 10 cu. ft. load in big hopper or 1200 lbs. on 4-ft. flat-bed, with one-man economy of operation.

Standard-make 4 h.p., 4-cycle gas engine easily takes full load up 20% grades or ramps.

Result: bigger loads, less operator fatigue, more trips . . . *3 to 4 times more production per man-hour with Moto-Bug.*

Handy 33" width easily clears narrow doorways and crowded aisles. Moto-Bug turns in own length. Maneuvering is easy with positive steer.

Low 38" hopper height permits direct discharge from mixer (6-S Dandie illustrated). Power carries load from mixer to forms, keeps output high.



Sturdy 4-ft. flat-bed platform carries 1200 lb. loads . . . has stake pockets for sideboards. Quickly interchangeable with 10 cu. ft. hopper.

Gravity dumps hopper instantly . . . or operator can control rate of discharge by handy rope control. Scoop-shaped hopper is free-flowing.

Send for Moto-Bug bulletin to KWIK-MIX CO. Port Washington, Wisconsin

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Company _____ Dept. _____

Street _____

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KWIK

(KOEHRING SUBSIDIARY)

Moto Bug

Quick spot, quick dump speed pouring on building and bridge floors. Dual drive wheels are optional equipment . . . dual steel wheels, standard.

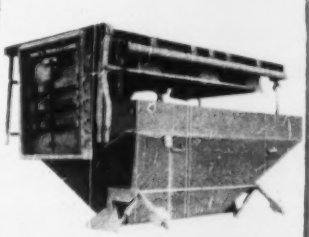
Moto Bug easily takes full load up 20% ramps. Operator rides on back step . . . takes it easy . . . moves bigger loads, makes more trips per hour.

-MIX COMPANY

CHASE PORT WASHINGTON, WIS.

ACCURATE..."HI-SPEED" ROADBUILDERS' Batcher

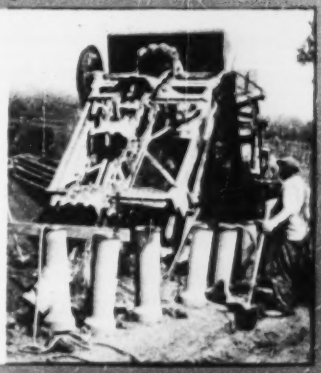
Johnson Roadbuilders' Batchers are completely portable . . . adaptable to fit similar bins . . . provide accurate control . . . produce top-quality concrete with utmost economy of materials. Handle 2, 3 or 4 aggregates in sizes for 34-E paver batch or 2, 3 or 4 yd. batch for charging transit mix trucks. Other Johnson sizes, types to fit production problems of any plant.



C. S. JOHNSON COMPANY
Champaign, Ill.
Koehring Subsidiary

310 TRENCHLINER* digs 15' deep, up to 54" wide

For your heaviest sewer, gas and water-main excavation, check this heavy-duty Parsons 310 Trenchliner. Digs to 15' deep . . . 54" wide . . . has 45 digging speeds from 8" to 186" per minute. Boom is telescopic, easily adjusted for digging depths . . . shifts to cut within 15" of either side of machine. Power shifts the arc-type spoil conveyor. 4 smaller Trenchliners also available.



PARSONS COMPANY
Newton, Iowa

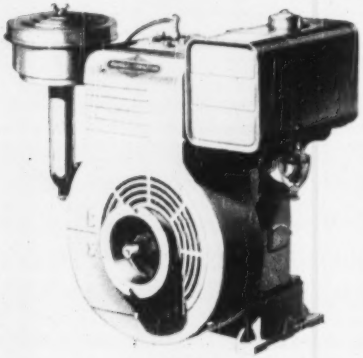
HALF-YARD 205 has self-adjusted clutches

With Koehring ½-yard 205, there's no time-out for daily manual clutch adjustments . . . no "compromise" settings. You get top operating efficiency from start to end of shift because heat-compensator springs on the 205's six main clutches make all tension changes automatically. That's only one of many ways this heavy-duty 205 gives you more work-time . . . bigger daily output. It will pay you to get all the facts on the 205.

KOEHRING COMPANY
Milwaukee 10, Wis.

Compact...

and TOUGH



Designed right – then built right – for the toughest kind of service, year after year.

Briggs & Stratton 4-cycle, single-cylinder, air-cooled gasoline engines are produced by an organization with over 30 years of engineering and manufacturing experience gained during the building of more than 4½ million air-cooled engines.

BRIGGS & STRATTON CORPORATION
Milwaukee 1, Wisconsin, U. S. A.

4 CYCLE
BRIGGS & STRATTON
GASOLINE ENGINES

chemicals are described in 20-p Booklet B. Double-deck, pontoon, and pan-type roofs are described, and the type of service for each is discussed. Cutaway views, typical plan views, and cross-section sketches illustrate construction and accessories included with each installation. Details are included for the sealing ring which closes the space between rim of roof and the tank shell.—CHICAGO BRIDGE & IRON CO., 332 S. MICHIGAN AVE., CHICAGO 4, ILL.

Handling of Special Steels—Methods for forming, joining, and painting Zincgrip-Paintgrip sheet steel is contained in an illustrated 12-p. booklet. This Armco product is a special zinc-coated and bonderized sheet steel which can be formed and drawn like mild steel and can be used for house panels, metal ceilings, tunnel equipment, roofing panels, templates, and other applications. Helpful suggestions are supplied on how to weld, solder, clean, and paint this material.—ARMCO STEEL CORP., 1040 CURTIS ST., MIDDLETOWN, OHIO.

Vertical Speed Reducers—Type ND (gear-shaft downward) and Type NU (gear-shaft upward) vertical speed reducers are completely described in Bulletin 125 (8 pp.). The bulletin lists six outstanding features of the Cleveland units, contains complete dimensional data, cross-section drawing, and thrust and overhung load capacity charts. Specifications are provided for the seven sizes in which each is available.—THE CLEVELAND WORM & GEAR CO., 5242 E. 130TH ST., CLEVELAND 4, OHIO.

Air-Recovery Bulletin—Activated-carbon air-recovery cells for air-conditioning systems and units are the subject of this 12-pager. Bulletin 117-C features a description of the Connor Type-C unit which is designed to be installed and serviced like standard dust filters, and which require no preliminary engineering design and minimum duct and accomodations. Specifications, arrangement details, capacity and resistance curves, and various types of applications are contained.—W. B. CONNOR ENGINEERING CORP., 116 E. 32 ST., NEW YORK 16, N. Y.

Convector Radiators—Heating With Convector Radiators is the title of a booklet now available. It features the use of clear illustrations and non-technical language to explain principles and advantages of this type of home heating.—CONVECTOR MANUFACTURERS ASSOCIATION, 221 N. LA SALLE ST., CHICAGO 1, ILL.

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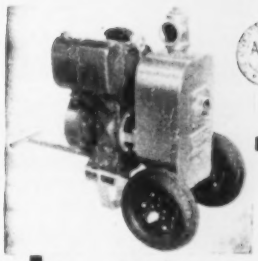

NEW! a modern line of self priming-centrifugal CONTRACTORS PUMPS by McGOWAN

Here's the pump with high capacity at low operation speed for longer engine life. All-welded construction for lighter, stronger, more durable unit. Automatic priming—no moving parts or jets. Improved non-clogging impeller of special iron alloy. Hardened wear plate for longer life. Fewer moving parts—hence less wear and lower maintenance cost. Large access plates—making inspection and repairs easier. Fully tested and trouble-free shaft seals.

All McGowan Pumps comply with contractors pump standards as adopted by the AGC. New Units—Rental Units. Repair Parts carried in stock by nation-wide dealers.

LEYMAN MANUFACTURING CORP., CINCINNATI 2, O.

KEEP YOUR CONVEYOR BELTS GOING

FLEXCO H D RIP PLATES

FLEXCO H D BELT FASTENERS

● Avoid shutdowns and lengthen the life of your conveyor belts and bucket elevator belts by using Flexco belt fasteners. Thousands of companies have stepped up the performance of conveyor lines and cut costs by using Flexco methods.

Bulletin F-100 shows exactly how to make tight butt joints in conveyor belts with Flexco. Also illustrates step by step the latest practice in repairing rips and putting in patches.

FLEXIBLE STEEL LACING CO.
4656 W. Lexington St., Chicago

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FLEXCO H-D BELT FASTENERS

Sold by supply houses everywhere

PERSPECTIVE . . .

". . . and damned if you don't"

If you're going to set up an authority to do public works, or direct or work for one, here's one fact for constant reference:

You may be only quasi-public—you may be paying your own way out of tolls or other charges, and have no taxing powers—but to the public you're a public agency. Your every action is open to examination, criticism and suggestion by a public that feels it may comment.

The public wants you to run your business on business principles. But the minute you start acting like big business—rejecting contracts, for example, because you don't think the bidder can do the job, or for other good business reasons—you can expect something that doesn't worry big business. The public want to know why.

• **Non-political, but**—The public wants you to stay out of politics too. At least it does until the public has a relative who needs a job, or unless a contractor feels aggrieved that he was not considered qualified. Then pressure is brought, and since your authority is non-political it is a wide-open and rather defenseless target.

Take it from Austin J. Tobin, executive director of the mammoth Port of New York Authority, that isn't the end of the tribulations. You decide to select or prequalify your bidders, so that you won't have to reject any of them, and the contractors not selected raise hue and cry. You're damned if you do, and damned if you don't.

Tobin should know. It's all happened to him, and recently. Solidly built, of medium size, gray-haired and rather handsome, he employs a lawyer's command of gesture and words to make his points. Independent, politically without blemish, he was on the PNYA legal staff 15 years before acceding to his present $45,000-a-year post eight years ago.

• **First—a purpose**—The nutshell says Tobin, is this: An authority can get a lot of things done that a municipality or a state cannot. But it's no sleight of hand trick.

To run an authority and have it function, you need a purpose like that behind PNYA—the development of the vast Port of New York. Here was a job that couldn't be done separately by the two states (New York and New Jersey) and the dozen cities that share the world's greatest natural harbor.

So, in 1921, the states entered what was in effect a treaty, pledging themselves to regional cooperation in developing the whole harbor area and northern New Jersey, through PNYA. The terms of the treaty were very broad—authorizing development of terminal and transportation facilities even to include air transport.

No lusty infant, the authority was immediately put on its own—it was directed to proceed "as rapidly as may be economically practicable" with the details of a plan (submitted in 1922) for the port development. Actually, it took 10 years—during which operation of the mint-like Holland tunnel was turned over to the agency—before PNYA finally became self-supporting. Up to then, the two states had appropriated $100,000 a year each to the support of their growing child, plus "substantial" contributions toward the construction of its four bridges.

Until the war days—with a few exceptions such as the Union railroad freight terminal in lower Manhattan—the authority commissioners had kept their agency pretty well in the business of building highway transport facilities. During the depression and the war, it operated these facilities. Postwar, it got up new steam to carry forward the plan of port development, to build truck terminals, take over airports (Newark, LaGuardia, Idlewild), and take over one port facility (Newark) and make offers to the cities that hope to "sell them" to take over others (Jersey City, Hoboken, New York).

• **Then a staff**—Next in importance, in Tobin's book, is an independent board of commissioners with wide business and professional experience. PNYA's 12 nonsalaried commissioners represent almost every interest in the two-state area, many interested in the operations, set on the agenda at the Board of Directors of any large corporation.

The staff below this level must be on a well-paid, career service, training-development basis.

This staff should be selected and promoted on ability and achievement alone, without political or personal interference. PNYA employs 5,000 people. They are selected by exam, promoted on merit, efficiency and exams.

Austin Tobin. . . . He's in the middle.

• **Then business**—Fiscal policies rate high in importance. PNYA, whose 1950 budget is $52,073,000, has set itself a two-point policy.

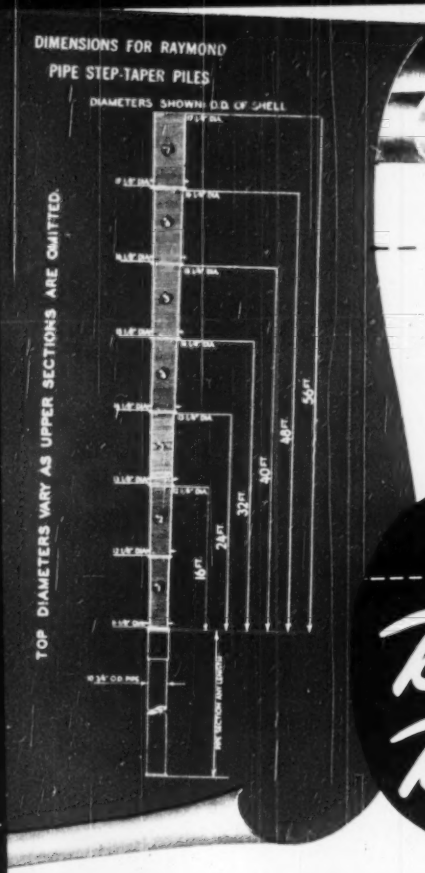
(1) To impress the need for budgeting on every staff member; (2) to make the budget sufficiently accurate for intelligent cost comparisons, and sufficiently flexible to meet new developments with a minimum of red tape and delay.

So PNYA starts each year with a lump-sum budget, subject to change by the board if conditions warrant. Each unit and division with responsibility for performance of a job is held to budgetary responsibility for that job; the accounting system has been integrated with the budget so that accounting information needed for budget control is always available.

PNYA uses a corporate accounting system—far different from normal municipal or governmental accounting. Thus operating facilities are charged with all overhead, including allocated overhead for use of centralized services and the cost of general management.

And just to prove PNYA is in business, here are some added facts. During its 28 years, the Authority has issued bonds for projects so far totaling with a face value of $170 million, has spent over $300 million for construction of bridges, tunnels, waterfront facilities, airports and terminals for trucks, buses and railroads. In 1949, vehicular facilities handled 72,700,000 trucks, buses and cars.

• **And a caution**—"Please remember," adds Tobin, "that there is no inherent magic in the creation of an authority. The important thing is not the form, but the degree of determination and the quality and quantity of work that you leaders will devote to it."



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Raymond installs every type of pile: cast-in-place concrete, pre-cast concrete, steel pipe, wood and H-beam. Raymond operations include underpinning, borings and soil investigations, waterfront construction and harbor and river improvements; also cement mortar lining of pipes by the Centriline Corporation, a Raymond Subsidiary.

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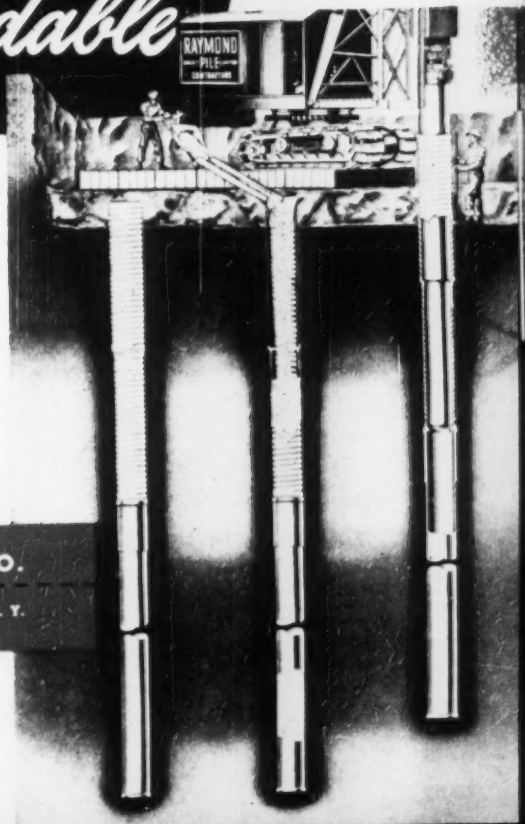

Raymond Pipe Step-Taper Piles are composed of an upper section of Step-Taper Shell Pile and a lower section of closed end steel pipe pile. These piles are generally used to penetrate thick beds of soft soil to reach hard bottom at depths as great as 150 feet or more. The pipe step-taper pile is a most dependable pile available for reaching hard ground at great depths.

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New Payloader has 4-wheel drive and 20 TIMKEN® bearings

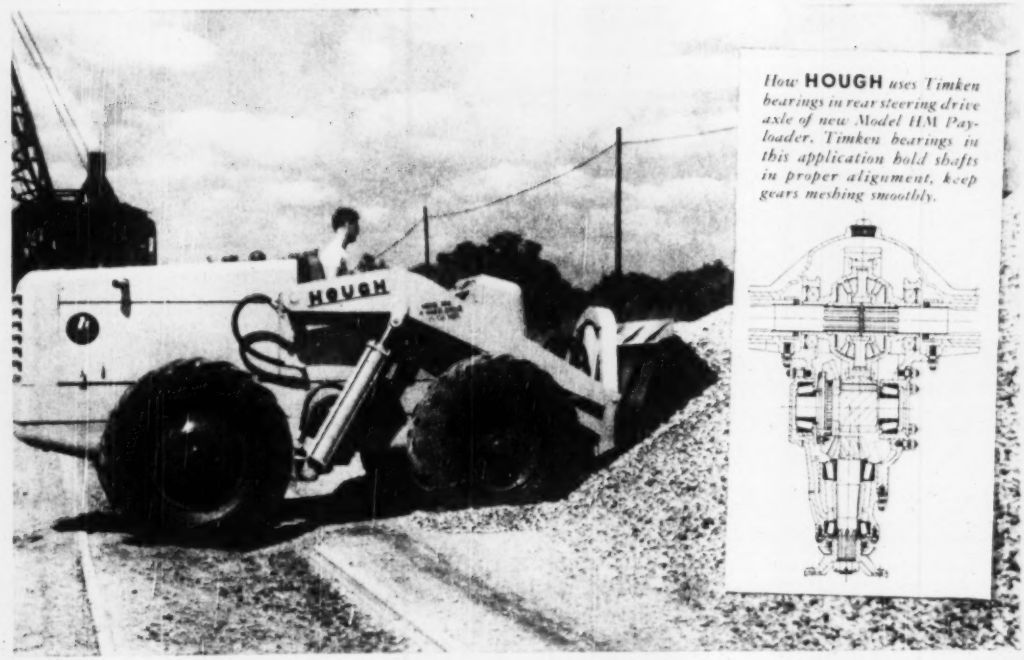
In addition to 4-wheel drive, the new Payloader recently introduced by The Frank G. Hough Company offers a whole raft of features. Power booster steering. Fully reversing transmission. Timken Detroit axle assembly. 4 speeds forward and reverse. And many others. And to insure long life and trouble-free operation, the wheels, steering axle and front axle are equipped with Timken® tapered roller bearings.

Due to the line contact between the rolls and races, Timken tapered roller bearings have extra load carrying capacity. Their tapered construction enables them to take any combination of radial and thrust loads. Wheels and shafts are held in proper alignment.

Timken bearings are manufactured to extreme limits of precision and finished to incredible smoothness, resulting in practically friction-free operation. Under normal usage they last the life of the machine because they are (1) carefully engineered for the job, (2) made of Timken fine alloy steel, and (3) precision manufactured.

For over half a century, the dependable performance of Timken bearings has made Timken-equipped products first choice throughout industry. When you specify bearings, specify Timken bearings. And when you buy new equipment, look for the Timken bearing equipped label on the machine—the trade-mark "Timken" on the bearings. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

This symbol on a product means all bearings are the best.



How **HOUGH** *uses Timken bearings in rear steering drive axle of new Model HM Payloader. Timken bearings in this application hold shafts in proper alignment, keep gears meshing smoothly.*

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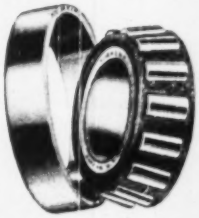

NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION